

# Fungal Systematics and Evolution: FUSE 1

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Fungal Systematics and Evolution (FUSE) is introduced as a new series to expedite the publication of issues relating to the epitypification of formerly described species, report new sexual-asexual connections, the merging of sexual and asexual genera following the end of dual nomenclature, and to describe species or note interesting observations regarding fungi. This first paper includes 18 new combinations, 13 new species, three new genera and one new family. All taxa are ascomycetes, except one novel species, which is a basidiomycete. Based on its acervular conidioma, *Septoria capensis* is allocated to the genus *Aceruloseptoria* (*Mycosphaerellaceae*, *Capnodiales*, *Dothideomycetes*). *Cheirospora botryospora* is shown to have a *Phialophora* synasexual morph, and to belong to the *Helotiales* (*Leotiomyces*). The genus *Circinotrichum* (*Xylariaceae*, *Xylariales*) is shown to be paraphyletic, and in need of revision. *Dictyochaeta triseptata* (*Chaetosphaeriaceae*, *Chaetosphaeriales*, *Sordariomycetes*) is reported on *Eucalyptus* twigs from Malaysia, and shown to have a microconidial morph. *Pseudodinemasporium fabiforme* (*Chaetosphaeriaceae*, *Chaetosphaeriales*, *Sordariomycetes*) is reported from leaf spots on *Acacia mangium* from Malaysia, and *Sclerostagonospora cycadis* (*Phaeosphaeriaceae*, *Pleosporales*, *Dothideomycetes*) on leaves of *Dioscorea composita* from Mexico. Novel taxa include: *Asperisporium caricicola* (*Mycosphaerellaceae*, *Capnodiales*, *Dothideomycetes*) from *Carica papaya* (Fiji), *Coniella peruensis* (*Schizoparmaceae*, *Diaporthales*, *Sordariomycetes*) from soil (Peru), *Curreya acacia* (*Cucurbitariaceae*, *Pleosporales*, *Dothideomycetes*) from *Acacia mangium* (Malaysia), *Verrucoconiothyrium nitidae* gen. nov. (*Didymosphaeriaceae*, *Pleosporales*, *Dothideomycetes*) from *Proteaceae* (South Africa), *Cyphellophoriella pruni* gen. et sp. nov. (*Chaetothyriaceae*, *Chaetothyriales*, *Eurotiomycetes*) from *Prunus* leaves (USA), *Mycotribulus indonesiae* (*Physalacriaceae*, *Agaricales*) from *Eucalyptus* leaves (Indonesia), *Myrmecridium spartii* (*Myrmecridiaceae*, *Myrmecridiales*, *Sordariomycetes*) and *Diaporthe spartiniicola* (*Diaporthaceae*, *Diaporthales*, *Sordariomycetes*) from *Spartium junceum* (Spain), *Neodevriesia poageni* (*Neodevriesiaceae*, *Capnodiales*, *Dothideomycetes*) on stems of *Poa* sp. (the Netherlands). Novel taxa from Germany include: *Dothiorella ulmacea* (*Botryosphaeriaceae*, *Botryosphaeriales*, *Dothideomycetes*) from *Ulmus laevis*, *Eleutheromyces pseudosubulatus* (*incertae sedis*, *Helotiales*) from *Lactarius scrobiculatus*, *Paracamarosporium fagi* (*Didymosphaeriaceae*, *Pleosporales*, *Dothideomycetes*) from *Fagus sylvatica*, *Phaeoisaria loranthacearum* (*incertae sedis*, *Sordariomycetes*) from *Loranthus europaeus*, and *Flammocladiella aceris* gen. et sp. nov. (*Flammocladiellaceae* fam. nov., *Hypocreales*) from *Acer platanoides*. An epitype is designated for *Phomatospora striatigera* (*incertae sedis*, *Sordariomycetes*) from *Typha angustifolia* (France).

Keywords: biodiversity, ITS barcodes, multi-gene phylogeny, systematics, typification.

The series Fungal Planet (FP) was launched in 2006 with the primary aim of providing a rapid and simplified outlet for researchers to describe species and thus removing a “bottleneck” that obstructed the description process. This series was subsequently produced as a compilation of short research papers appearing in *Persoonia* in June and

December each year (Crous et al. 2014 b, c). However, for many of the genera encountered, it became evident that they were either poly- or paraphyletic, and that this could be resolved only by physically recollecting the type species, and designating epitype or neotypes to stabilise the application of generic names. This initiative became known as the Genera

of Fungi (GoF) project (Kirk et al. 2013, Crous et al. 2014 a).

Despite the important role that FP and GoF are playing, issues such as interesting observations relating to known species, epitypification of formerly described species, novel species lacking background photos of the collection site, investigation of the phylogenetic position of known species, new sexual-aseexual connections, the merging of sexual and asexual genera following the end of dual nomenclature (Hawksworth et al. 2011, Wingfield et al. 2012), and linking novel synasexual morphs to known or novel species are not well-suited to these two series. To address this, the present series, named Fungal Systematics and Evolution (FUSE), reflecting the fusion of phenotypic data with those relating to the genotype, is introduced here. Authors who wish to contribute to future issues in this series can e-mail submissions to Pedro Crous (p.crous@cbs.knaw.nl), Olinto Pereira (oliparini@gmail.com) or Chiharu Nakashima (chiharu@bio.mie-u.ac.jp). In parallel with the schedule for FP, which appears in *Persoonia*, and GoF published in *IMA Fungus*, FUSE will appear in *Sydowia*.

## Materials and methods

### Isolates

Leaves and twigs were placed in damp chambers, and incubated at room temperature for 1–2 d. Single conidial colonies were grown from sporulating conidiomata in Petri dishes containing 2 % malt extract agar (MEA) as described earlier by Crous et al. (1991). Leaf and stem tissues bearing ascomata were soaked in water for approximately 2 h, after which they were placed on the bottom, inside the inner surfaces of Petri dish lids, with the top half of the dish containing MEA. Ascospore germination patterns were determined after 24 h, and single ascospore or conidial cultures were established following the method described by (Crous 1998). Colonies were sub-cultured onto 2 % potato-dextrose agar (PDA), oatmeal agar (OA), MEA (Crous et al. 2009 c), autoclaved pine needles on 2 % tap water agar (PNA) (Smith et al. 1996), and incubated at 25 °C under continuous near-ultraviolet light to promote sporulation. Reference strains and specimens are maintained at the CBS-KNAW Fungal Biodiversity Centre in Utrecht, the Netherlands (CBS).

### DNA isolation, amplification and analyses

Genomic DNA was extracted from fungal colonies growing on MEA using the UltraClean™ Microbial DNA Isolation Kit (MoBio Laboratories, Inc., Solana Beach, CA, USA) following the manufacturer's protocol. The primers V9G (de Hoog & Gerrits van den Ende 1998) and LR5 (Vilgalys & Hester 1990) were used to amplify part (ITS) of the nuclear rDNA operon spanning the 3' end of the 18S nrRNA gene, the first internal transcribed spacer (ITS1), the 5.8S nrRNA gene, the second ITS region (ITS2) and approximately 900 bp of the 5' end of the 28S nrRNA gene. The primers ITS4 (White et al. 1990) and LSU1Fd (Crous et al. 2009 b) were used as internal sequence primers to ensure good quality sequences over the entire length of the amplicon. Amplification conditions followed Cheewangkoon et al. (2008). SeqMan v. 7.0.0 (DNASTAR, Madison, WI, USA) was used to compute consensus sequences. BLAST searches using ITS and LSU sequences were performed for each strain and the closest matches were retrieved and included in the phylogenetic analyses. An overview LSU tree was inferred to determine the higher order phylogenetic placement and ITS phylogenies for selected species to determine higher resolution placement at the species level or in cases where the LSU sequence was not available. The sequence alignment and subsequent phylogenetic analyses of the alignments were carried out using methods described by Crous et al. (2006) for parsimony and Groenewald et al. (2013) for Bayesian analyses. Gaps were treated as "fifth state" data in the parsimony analysis. Novel sequence data were deposited in GenBank (Tab. 1) and the alignments and trees in TreeBASE (ID 17621; <http://www.treebase.org>) (Fig. 1). Remaining sequence data are discussed under the species notes below and statistical parameters are indicated in the figure legends of phylogenetic trees.

### Morphology

Slide preparations were mounted in clear lactic acid, or Shear's mounting fluid from colonies sporulating on MEA, PDA, PNA, or OA. Sections of conidiomata were made by hand. Observations were made with a Zeiss V20 Discovery dissection-microscope (Zeiss, Oberkochen, Germany), and with a Zeiss Axio Imager 2 compound microscope using differential interference contrast (DIC) illumination and an AxioCam MRc5 camera and Zen software. Additional photomicrographs were made

**Tab. 1.** Details of sequences and/or strains included in the molecular (treated species in overview LSU and camarasporium-like phylogenies) and morphological analyses.

Species	Strain accession number <sup>1</sup>	Locality	Substrate	Collector(s)	GenBank accession numbers <sup>2</sup>	
					ITS	LSU
<i>Alloconiothyrium aptrootii</i>	CBS 981.95, ex-type	Papua New Guinea	Soil	A. Aptroot	JX496122	JX496235
<i>Aspensporium caricicola</i>	CBS 139998 = CPC 24348 = MUMH11477, ex-type	Republic of Fiji	Leaves of <i>Carica papaya</i>	C. Nakashima	KR611869	KR611891
<i>Camarosporium leucadendri</i>	CBS 123027	South Africa	Twig litter of <i>Brabejum stel-latifolium</i>	S. Lee	EU552106	EU552106
<i>Cheirospora botryospora</i>	CBS 139999 = CPC 24603	Germany	Branches of <i>Fagus sylvatica</i>	R.K. Schumacher	KR611870	KR611892
<i>Cheirospora botryospora</i>	CPC 24605	Germany	Branches of <i>Fagus sylvatica</i>	R.K. Schumacher	KR611871	KR611893
<i>Cheirospora botryospora</i>	CPC 24607	Germany	Branches of <i>Fagus sylvatica</i>	R.K. Schumacher	KR611872	KR611894
<i>Cheirospora botryospora</i>	CPC 24611	Germany	Branches of <i>Fagus sylvatica</i>	R.K. Schumacher	KR611873	–
<i>Circinotrichum maculiforme</i>	CBS 122758 = FMR 9645	Spain	Plant debris	J. Capilla, R. Castañeda & C. Silvera	KR611875	KR611896
<i>Circinotrichum maculiforme</i>	CPC 24566	Czech Republic	Twig of <i>Loranthus euro-paeus</i>	R. Gebauer	KR611874	KR611895
<i>Circinotrichum papakurae</i>	CBS 101373 = INIFAT C98/17-8	Brazil	Rotten leaf	R.F. Castañeda	KR611876	KR611897
<i>Coniella peruensis</i>	CBS 110394, ex-type	Peru	Soil of rain forest	M. Christensen	KJ710463	KJ710441
<i>Coniothyrium palmarum</i>	CBS 400.71	Italy	Dead petiole of <i>Chamaerops humilis</i>	W. Gams	AY720708	JX681084
<i>Coniothyrium palmarum</i>	CBS 758.73 = CMW 5283	Israel	Leaf spot of <i>Phoenix dactylifera</i>	Y. Pinkas	Q-bank	JX681085
<i>Coniothyrium palmicola</i>	CBS 161.37	Germany	Stem of <i>Pandanus tectoriae</i>	–	JX681086	JX681086
<i>Curreya acaciae</i>	CBS 140000 = CPC 24801, ex-type	Malaysia	Dead leaves of <i>Acacia mangium</i>	M.J. Wingfield	KR611877	KR611898
<i>Cyphellophoriella pruni</i>	CBS 140001 = CPC 25120, ex-type	USA	Apparently healthy leaf of a <i>Prunus</i> sp.	A.F. Smith	KR611878	–
<i>Dendrothyrium longisporum</i>	CBS 824.84	Germany	Leaf spot in <i>Triticum aestivum</i>	M. Hossfeld	JX496115	JX496228
<i>Dendrothyrium varisporum</i>	CBS 121517, ex-type	Syria	From declined grape vine	K.A. Halim	JX496030	JX496143
<i>Diaporthe spartinicola</i>	CBS 140003 = CPC 24951, ex-type	Spain	Stem of <i>Spartium junceum</i>	S. Tello	KR611879	–
<i>Dictyochaeta triseptata</i>	CBS 140002 = CPC 24797	Malaysia	Twig of <i>Eucalyptus</i> sp.	M.J. Wingfield	KR611880	–
<i>Dothiorella ulmacea</i>	CBS 138855 = CPC 24416, ex-type	Germany	Twig of <i>Ulmus laevis</i>	R.K. Schumacher	KR611881	KR611899
<i>Dothiorella ulmacea</i>	CBS 140005 = CPC 24945	Germany	Twigs of <i>Ulmus laevis</i>	R.K. Schumacher	KR611882	KR611900
<i>Eleutheromyces pseudosubulatus</i>	CBS 458.88, ex-type	Germany	<i>Lactarius scrobiculatus</i>	W. Helfer	KJ710467	EU754162

Species	Strain accession number <sup>1</sup>	Locality	Substrate	Collector(s)	GenBank accession numbers <sup>2</sup>	
					ITS	LSU
<i>Flammoclaidiella aceris</i>	CBS 138906 = CPC 24422, ex-type	Germany	Twigs of <i>Acer platanoides</i>	R. K. Schumacher	KR611883	KR611901
<i>Kalmusia ebuli</i>	CBS 123120, ex-neotype	France	On decorticated wood of <i>Populus tremula</i>	leg. B. Declercq	KF796674	JN644073
<i>Microsploeropsis arundinis</i>	CBS 100243	Brazil	Soil	–	JX496010	JX496123
<i>Mycotribulus indonesiae</i>	CBS 133172 = CPC 20836, ex-type	Indonesia	Leaves of <i>Eucalyptus pellita</i> × <i>E. brassiana</i>	M. J. Wingfield	KJ710483	KJ710458
<i>Myrmecridium spartii</i>	CBS 140006 = CPC 24953, ex-type	Spain	Stem of <i>Spartium junceum</i>	S. Tello	KR611884	KR611902
<i>Neodevriesia agapanthi</i>	CBS 132689 = CPC 19833, ex-type	South Africa	<i>Agapanthus africanus</i>	P. W. Crous	JX069875	JX069859
<i>Neodevriesia bulbilosa</i>	CBS 118285 = TRN81, ex-type	Spain: Mallorca	Rock sample	C. Ruibal	AY559341	KF310029
<i>Neodevriesia capensis</i>	CBS 130602 = CPC 18299, ex-type	South Africa	<i>Protea</i> sp.	P. W. Crous	JN712501	JN712569
<i>Neodevriesia imbrexigena</i>	CAP1371	Portugal	Glazed decorative tiles in association with <i>Trebouxia</i> sp.	M. L. Coutinho	JX915745	JX915749
<i>Neodevriesia knordaviesii</i>	CBS 122898 = CPC 14960, ex-type	South Africa	<i>Protea</i> sp.	P. W. & M. Crous	EU707865	EU707865
<i>Neodevriesia lagerstroemiae</i>	CBS 125422 = CPC 14403, ex-type	USA	<i>Lagerstroemia indica</i>	P. W. Crous & M. J. Wingfield	GU214634	KF902149
<i>Neodevriesia modesta</i>	CBS 137182 = CCFEE 5672, ex-type	Italy	Rock sample	–	KF309984	KF310026
<i>Neodevriesia poagena</i>	CBS 140007 = CPC 25086, ex-type	Netherlands	Stems of <i>Poa</i> sp.	W. Quaedvlieg	KR611885	KR611903
<i>Neodevriesia queenstandica</i>	CBS 129527 = CPC 17306, ex-type	Australia	<i>Scaevola taccada</i>	P. W. Crous, R. G. Shivas & A. R. McTaggart	JF951148	KF901839
<i>Neodevriesia shakazulii</i>	CBS 133579 = CPC 19784, ex-type	South Africa	<i>Aloe</i> sp.	P. W. Crous	KC005776	KC005797
<i>Neodevriesia simplex</i>	CBS 137183 = CCFEE 5681, ex-type	Italy	Rock sample	–	KF309985	KF310027
<i>Neodevriesia stiringiae</i>	CBS 133581 = CPC 19948, ex-type	Australia	<i>Stirlingia latifolia</i>	W. Gams	KC005778	KC005799
<i>Neodevriesia strelitziae</i>	CBS 122379 = X1037, ex-type	South Africa	<i>Strelitzia nicotai</i>	W. Gams & H. Glen	EU436763	GU301810
<i>Paracamarosporium hawaiiense</i>	CBS 120025 = CPC 12265, ex-type	USA: Hawaii	Stem of <i>Sophora chryso-phylla</i>	W. Gams & Y. Degawa	JX496027	JX496140
<i>Paracamarosporium psoraleae</i>	CBS 136628 = CPC 21632, ex-type	South Africa	Stems of <i>Psoralea pinnata</i>	M. J. Wingfield	KF777143	KF777199

Species	Strain accession number <sup>1</sup>	Locality	Substrate	Collector(s)	GenBank accession numbers <sup>2</sup>	
					ITS	LSU
<i>Paraconiothyrium "hawaiiense"</i>	CZ513	–	–	–	FJ755252	FJ755252
<i>Paraconiothyrium brasiliense</i>	CBS 254.88	Italy	<i>Magnolia</i>	–	JX496058	JX496171
<i>Paraconiothyrium cyclothyrioides</i>	CBS 432.75	Sri Lanka	Soil under <i>Hevea brasiliensis</i>	–	JX496088	JX496201
<i>Paraconiothyrium estuarinum</i>	CBS 109850, ex-type	Brazil	Sediment from estuarine habitat	M. da Silva	JX496016	JX496129
<i>Paraconiothyrium fagi</i>	CBS 140008 = CPC 24890, ex-type	Germany	Twig of <i>Fagus sylvatica</i>	R.K. Schumacher	KR611886	KR611904
<i>Paraconiothyrium fagi</i>	CPC 24892	Germany	Twig of <i>Fagus sylvatica</i>	R.K. Schumacher	KR611887	KR611905
<i>Paraconiothyrium fuckelii</i>	MFLUCC 13-0073	Thailand	Dead wood	K.M. Thambugala	KJ939278	KJ939281
<i>Paraconiothyrium fungicola</i>	CBS 113269, ex-type	USA	Resupinate polypore fungus	B.W. Horne	JX496020	JX496133
<i>Paraconiothyrium fuscomaculans</i>	CBS 116.16, ex-epitype	USA	Wood of <i>Malus</i> sp.	–	Q-bank	EU754197
<i>Paraconiothyrium maculiculis</i>	CBS 101461 = UTHSC 87-144	USA	Man, cutaneous lesions	–	Q-bank	EU754200
<i>Paraconiothyrium minitans</i>	CBS 122786 = PD 99/1064-1	Netherlands	<i>Clematis</i>	J. de Gruyter	Q-bank	EU754174
<i>Paraconiothyrium minitans</i>	CBS 122788 = IPO 1514 = PD 07 03486739	UK	–	J.W.Veenbos	Q-bank	EU754173
<i>Phaeoisaria lorantheae</i>	CBS 140009 = CPC 24441, ex-type	Germany	Twigs of <i>Loranthus euro-paeus</i>	K.-H. Rehn	KR611888	–
<i>Phomatospora striatigera</i>	CBS 133932 = CPC 21263, ex-epitype	France	Leaves of <i>Typha angustifolia</i>	A. Gardienet	KM213617	KM213618
<i>Pseudocamarosporium africanum</i>	CBS 121166 = STE-U 6316, ex-type	South Africa	<i>Prunus persica</i>	U. Damm	JX496029	JX496142
<i>Pseudocamarosporium brabeji</i>	CBS 123026 = CPC 13162 = CMW 22165	South Africa	Twig litter of <i>Protea</i> sp.	S. Lee	EU552105	EU552105
<i>Pseudocamarosporium lonicerae</i>	MFLUCC 13-0532 = ICMP 20370 = GUCC 0011, ex-type	Italy	Stem of <i>Lonicera</i> sp.	E. Camporesi	KJ747047	KJ813278
<i>Pseudocamarosporium piceae</i>	MFLUCC 14-0192 = ICMP 20203 = GUCC 0012, ex-type	Italy	Dead cones of <i>Picea excels</i>	E. Camporesi	KJ747046	KJ803030
<i>Pseudocamarosporium propinquam</i>	MFLUCC 13-0544 = ICMP 20371 = GUCC 0013, ex-epitype	Italy	Dead branch of <i>Salix</i> sp.	E. Camporesi	KJ747049	KJ813280
<i>Pseudocamarosporium tilicola</i>	MFLUCC 13-0550 = ICMP 20372 = GUCC 0014, ex-type	Germany	Branch of <i>Tilia</i> sp.	R.K. Schumacher	KJ747050	KJ813281

Species	Strain accession number <sup>1</sup>	Locality	Substrate	Collector(s)	GenBank accession numbers <sup>2</sup>	
					ITS	LSU
<i>Pseudoinemaspodium fabiforme</i>	CBS 140010 = CPC 24781, ex-type	Malaysia	Leaf spots of <i>Acacia mangium</i>	M.J. Wingfield	KR611889	KR611906
<i>Pyrenochaeta protearum</i>	CBS 131315 = CPC 16322, ex-type	South Africa	Leaves of <i>Protea mundii</i>	P.W. Crous	JQ044434	JQ044453
<i>Sclerostagonospora cycadis</i>	CBS 123538 = CPC 12388, ex-type	Japan	Living leaves of <i>Cycas revoluta</i>	P.W. Crous & G. Okada	FJ372393	FJ372410
<i>Sclerostagonospora cycadis</i>	CBS 291.76	Mexico	Diseased leaves of <i>Dioscorea composita</i>	G.F. Bonavia	KR611890	–
<i>Verrucoconiothyrium nitidae</i>	CBS 119209 = CMW 19988	South Africa	Dead twigs of <i>Leucadendron salignum</i>	S. Lee	EU552112	EU552112
<i>Xenocamarosporium acaciae</i>	CBS 139895 = CPC 24755, ex-type	Malaysia	Leaf spots of <i>Acacia mangium</i>	M.J. Wingfield	KR476724	KR476759

<sup>1</sup> CBS: CBS Fungal Biodiversity Centre, Centraalbureau voor Schimmelcultures, Utrecht, The Netherlands; CCFEE: Culture collection from extreme environments of the Dipartimento di Scienze Ambientali, University of Tuscia, Viterbo, Italy; CMW: Culture collection of the Forestry and Agricultural Biotechnology Institute (FABI) of the University of Pretoria, Pretoria, South Africa; CPC: Collection Pedro Crous, housed at CBS; FMR: Facultad de Medicina, Reus, Tarragona, Spain; GUCC: Department of Plant Pathology, Agriculture College, Guizhou University, China; ICMP: Landcare Research, New Zealand; INIFAT: Alexander Humboldt Institute for Basic Research in Tropical Agriculture, Ciudad de La Habana, Cuba; MFLUCC: Culture collection of Mae Fah Luang University (MFLU), Chiang Rai, Thailand; MUMH: ; PD: Dutch National Reference Laboratory of the Plant Protection Service, Wageningen, Netherlands; STE- U: Department of Plant Pathology, University of Stellenbosch, South Africa; TRN: T. Ruibal private collection; UTHSC: University of Texas Health Sciences Center, San Antonio, TX, USA; X: Working collection of Mahdi Arzanlou.

<sup>2</sup> ITS: internal transcribed spacers and intervening 5.8S nrDNA; LSU: partial 28S nrDNA; Q-bank: sequence was obtained from the Q-bank database ([www.q-bank.eu/fungi](http://www.q-bank.eu/fungi)).

using a Nikon Eclipse Ni-U microscope (Nikon, Tokyo, Japan), a Nikon SMZ1500 stereo-microscope, Nikon DS-U3 digital camera and Nis Elements imaging software. Colony characters and pigment production were noted after 1 month of growth on MEA, PDA and OA (Crous et al. 2009 c) incubated at 25 °C. Colony colours (surface and reverse) were scored according to the colour charts of Rayner (1970). Taxonomic novelties are registered in MycoBank (www.Mycobank.org; Crous et al. 2004).

### Taxonomy

***Acervuloseptoria capensis* (G. Winter) Crous, comb. nov.** – Fig. 2  
MycoBank MB812521

Basionym. – *Septoria capensis* G. Winter, *Hedwigia* 24: 33. 1885.

Description. – Leaf spots amphigenous, subcircular, 2–4 mm diam., centre grey to pale brown, with raised red-purple border. – Conidiomata black, epiphyllous, acervular, circular, separate, subepidermal, erumpent, up to 250 µm diam.; wall of 3–6 layers of brown *textura angularis* to *textura intricata*. – Conidiophores subcylindrical, hyaline, smooth, 1–3-septate, branched at the top, 10–30 × 2.5–3 µm. – Conidiogenous cells terminal and lateral, subcylindrical, hyaline, smooth, proliferating percurrently at apex, 10–15 × 2.5–3 µm. – Conidia subcylindrical, flexuous, guttulate, smooth, hyaline, apex obtusely rounded, base obconically truncate, (27)30–40(45) × (2)2.5–3 µm, (1)3-septate.

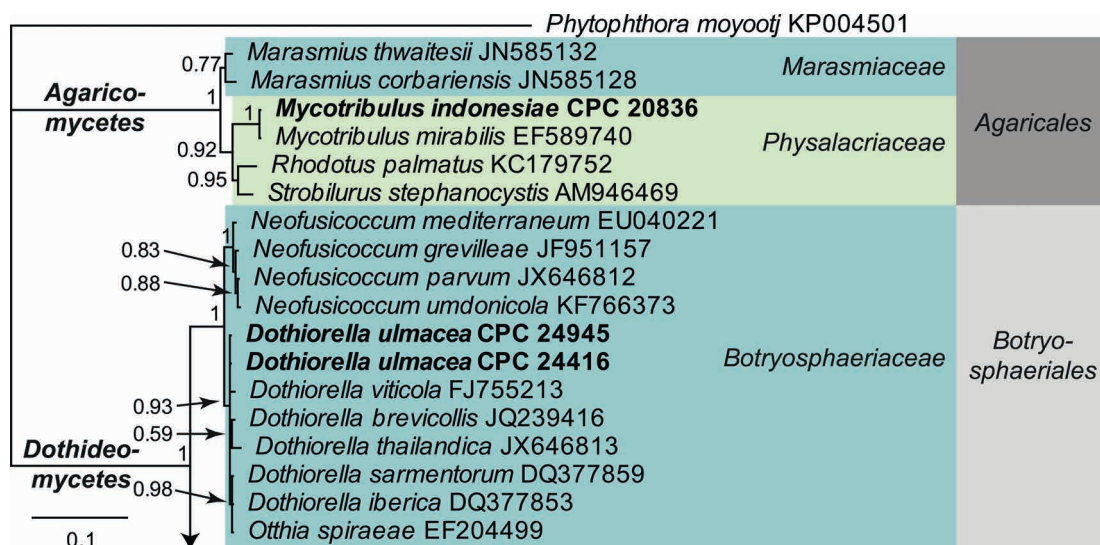
Material examined. – SOUTH AFRICA, on living leaves of *Ziziphus mucronata* (Rhamnaceae), P. MacOwan No. 1440 (holotype B 700021850).

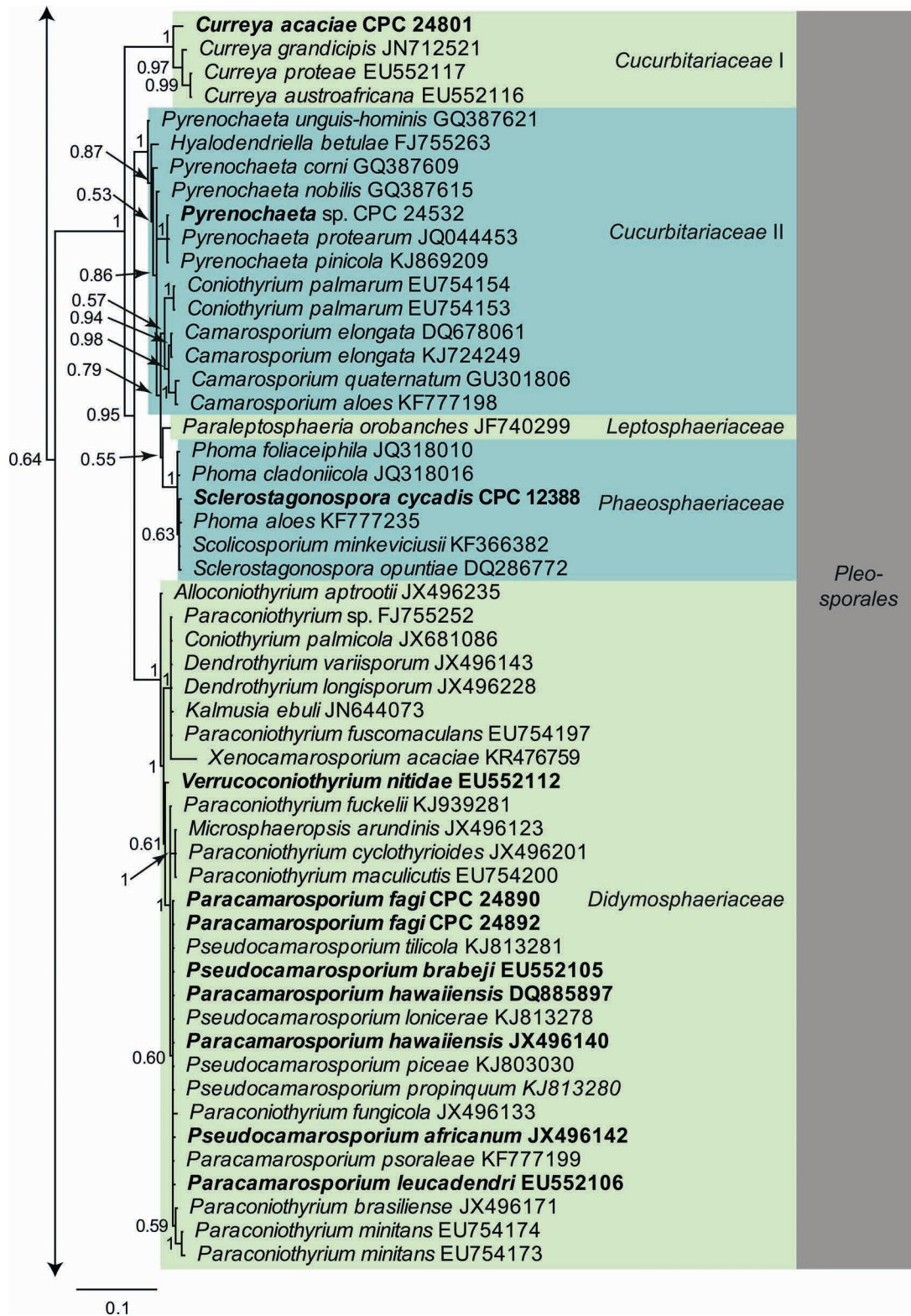
Notes. – The genus *Septoria* and allied genera were recently treated (Quaedvlieg et al. 2013, Verkley et al. 2013). The main difference between *Septoria* and *Acervuloseptoria* (*Mycosphaerellaceae*, *Capnodiales*, *Dothideomycetes*) is in the conidiomatal morphology of the latter, which has black, erumpent conidiomata, on which the top layer disintegrates, forming an acervulus. *Septoria capensis* was originally described as having conidia that are 30–50 × 2–2.5 µm (Winter 1885), which matches what we observed on the type specimen. However, given its acervular conidiomata, this species is best accommodated in the monotypic genus *Acervuloseptoria* in the *Mycosphaerellaceae* (Crous et al. 2014 b). One other species occurs on *Ziziphus*, namely *A. ziziphicola*, which has larger conidia [(40)55–75(80) × 3(4) µm, 3(5)-septate; Crous et al. 2014 b].

Author: P. W. Crous

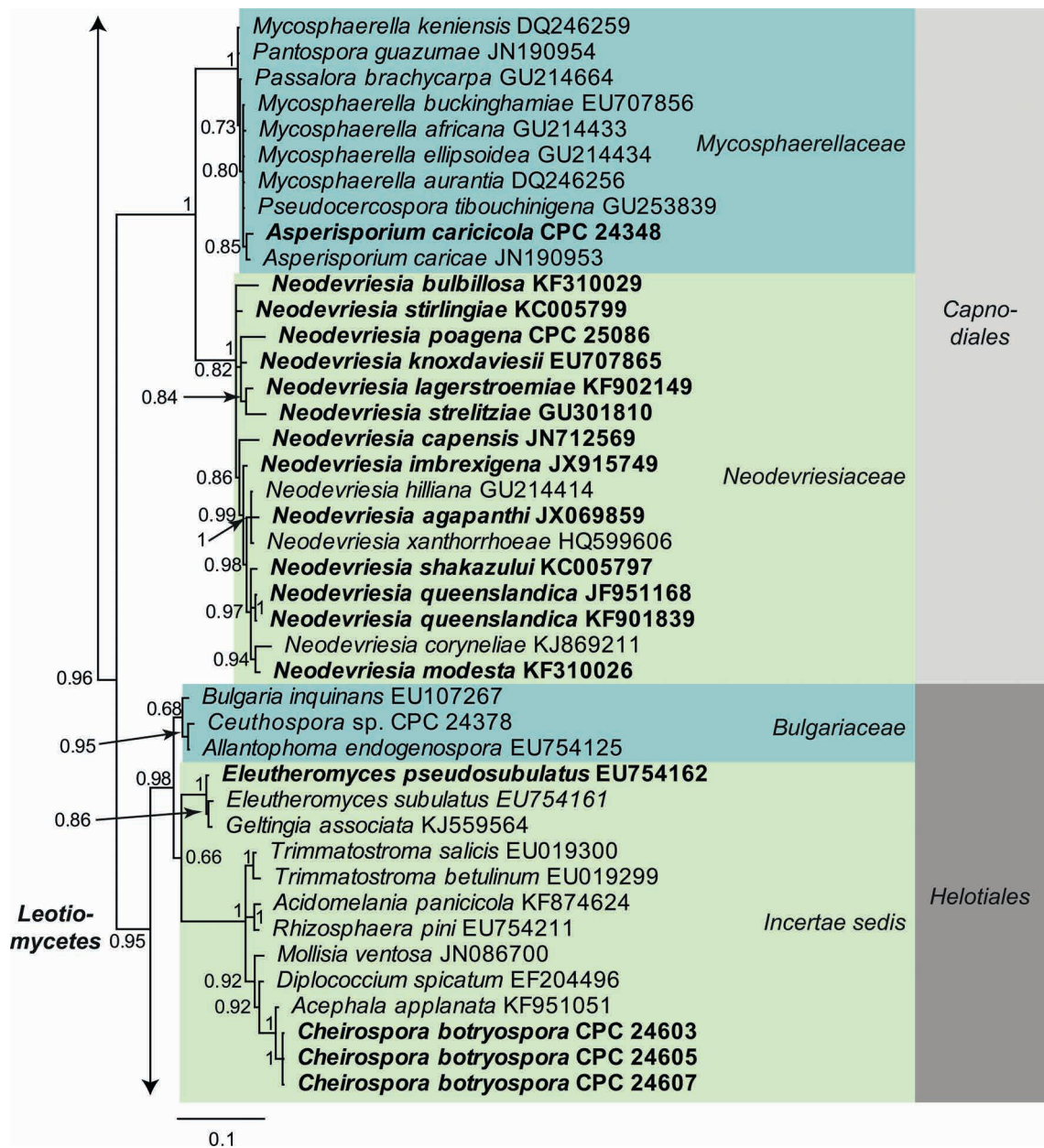
***Asperisporium caricicola* Crous & C. Nakash., sp. nov.** – Fig. 3  
MycoBank MB812522

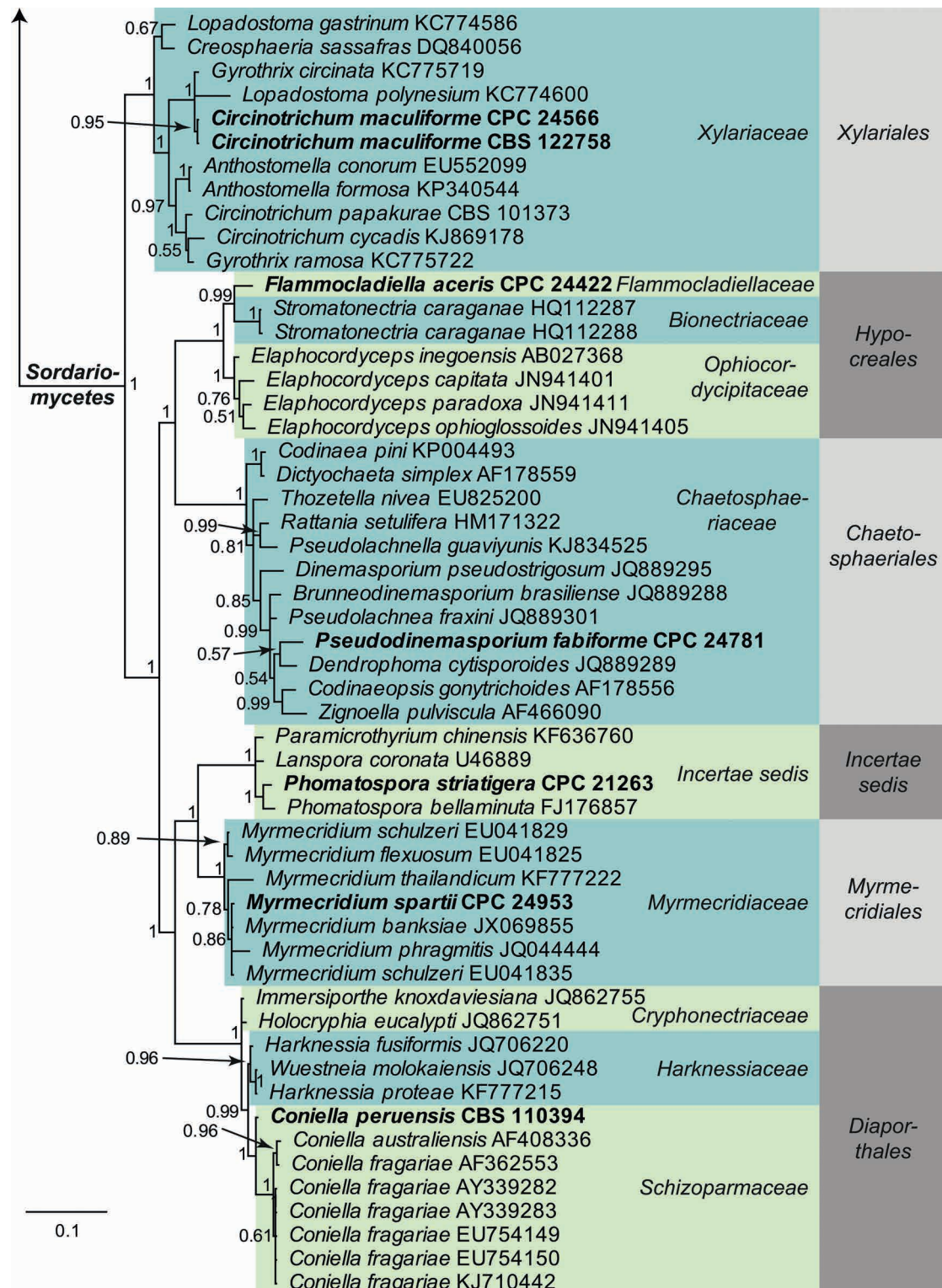
Description. – Leaf spots medium brown, scattered, circular to subcircular, 3–4 mm diam. – Sporodochia up to 100 µm diam., formed on stromata, immersed becoming erumpent, punctiform, blackish to black, round, dry. – Conidiophores tightly aggregated, unbranched or branched in the lower part, straight to slightly sinuous, verruculose, medium to dark brown, 1–3-septate, 30–50 × 7–15 µm. – Conidiogenous cells



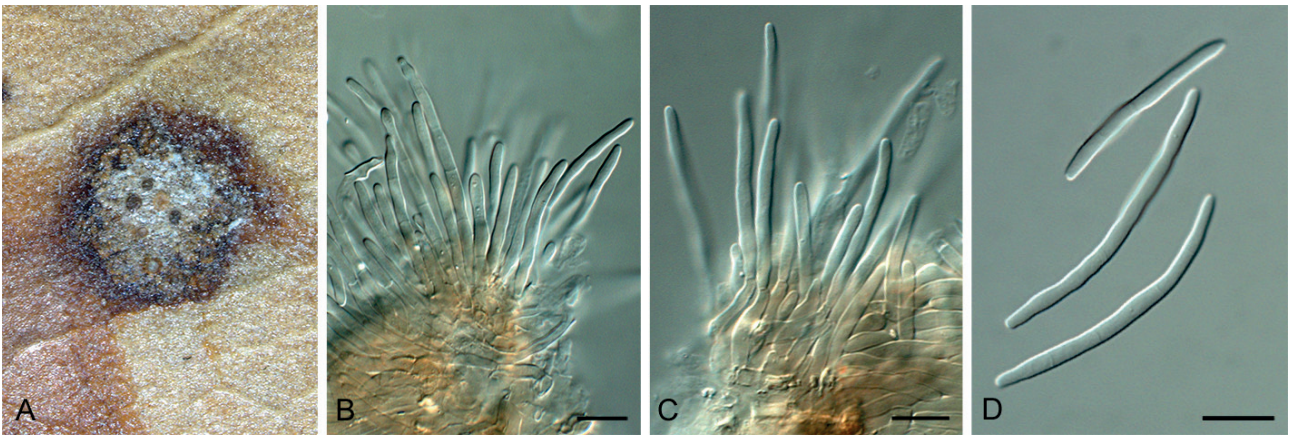




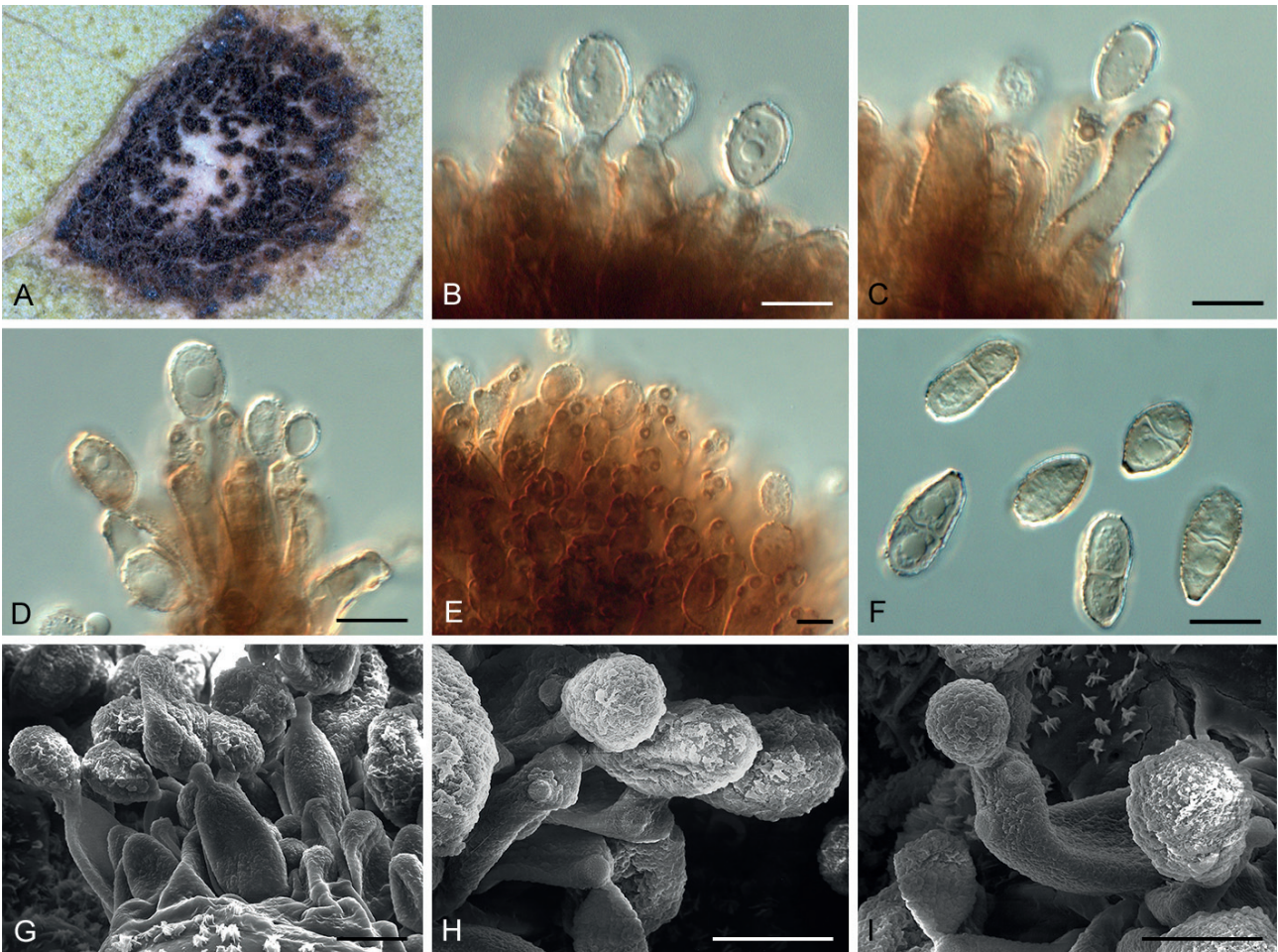




**Fig. 1.** Consensus phylogram (50 % majority rule) of 4 900 trees resulting from a Bayesian analysis of the LSU sequence alignment (421 unique site patterns) using MrBayes v. 3.2.1 (Ronquist et al. 2012). Bayesian posterior probabilities are indicated at the nodes and the scale bar represents the expected changes per site. Families and orders are indicated to the right of the tree and classes at the nodes to the left of the tree. Species treated here for which LSU sequences were available are shown in bold face. The tree was rooted to *Phytophthora moyooti* (GenBank KP004501).



**Fig. 2.** *Acervuloseptoria capensis* (B 700021850). **A.** Leaf spot with conidiomata. **B, C.** Conidiophores giving rise to conidia. **D.** Conidia. Scale bars = 10  $\mu$ m.



**Fig. 3.** *Asperisporium caricicola* (CBS H-22252). **A.** Leaf spot. **B–E.** Conidiophores with scars. **F.** Conidia. **G–I.** SEM photomicrographs of conidiogenous cells and conidia. Scale bars = 10  $\mu$ m.

10–30 × 7–12 µm, integrated, terminal, polyblastic, sympodial, cylindrical to clavate, conidiogenous loci thickened, darkened, 2–2.5 µm diam. – Conidia (15)17–19(23) × (7)8–9(10) µm, thick-walled, guttulate to granular, solitary, broadly ellipsoidal to somewhat clavate, verruculose to verrucose, pale to medium brown, mostly 1-septate slightly above the median, rarely 2-septate; hila thickened and darkened, 2–3 µm diam.

**Etymology.** – Name reflects the host genus *Carica* from which this fungus was isolated.

**Culture characteristics.** – Colony surface erumpent, folded, lacking aerial mycelium, reaching 7 mm diam. after 1 month at 25 °C. On MEA, PDA and OA surface pale mouse grey, reverse olivaceous black.

**Material examined.** – REPUBLIC OF FIJI, Viti Levu, Navua, on leaves of *Carica papaya* (Caricaceae), 10 Sept. 2013, leg. C. Nakashima (holotype CBS H-22252, cultures ex-type CPC 24348 = CBS 139998, CPC 24349).

**Notes.** – The genus *Asperisporium* (Mycosphaerellaceae, Capnodiales, Dothideomycetes), which is based on *A. caricae*, was regarded as a probable synonym of *Passalora* (Crous & Braun 2003), but was recently shown to be distinct based on molecular data (Minnis et al. 2011). *Asperisporium caricae* causes a black spot or blight disease of papaya (*Carica papaya*), leading to defoliation (old leaves) and spots on fruit. *Asperisporium caricicola* was isolated from small, brown leaf spots of *Carica papaya* collected in Fiji. Although it is phylogenetically distinct from the epitype of *A. caricae* (conidia 14–22 × 8–13 µm; Minnis et al. 2011) it is morphologically similar, and could not be distinguished based only on morphology. However, based on ITS sequence data, our sequence is 97 % (532/547 characters) identical to *Asperisporium caricae* (GenBank JN190955) and the two species are also different based on their LSU sequences (Fig. 1).

**Authors:** P. W. Crous & C. Nakashima

***Cheirospora botryospora*** (Mont.) Fr., *Summa veg. Scand.*: 508. 1849. – Fig. 4

**Basionym.** – *Stilbospora botryospora* Mont., *Annls Sci. Nat., Bot., sér. 2* 6: 338. 1836.

**Description.** – Acervuli erumpent through the bark, corticolous, densely crowded, unilocular, lense-shaped with flattened base, opening via irregularly rupture; wall consisting of a few layers of brown *textura angularis* with thin-walled and smooth cells, inner layer hyaline. – Conidiogenous cells cylindrical, septate, long-stalked, end cell enlarged and apically flattened, hyaline,

thin-walled, smooth and eguttulate, evanescent, holoblastic. – Conidia numerous, black in mass on the outer surface of the bark, with a cylindrical to faintly botryoidal base and 3 central cells, both central end cells flattened, dark olivaceous, guttulate, septa thin-walled and smooth, forming acropetal branches that form a globose mass of cells, surrounded by a persistent gelatinous sheath, up to 12 µm diam., (27)39(49) × (19.5)22(27) µm (resembling bunches of grapes). Synasexual morph on OA. – Mycelium consisting of pale brown, septate, branched, 2–3 µm diam. hyphae, frequently with mucoid sheath. Hyphae forming clusters of *Cheirospora* conidia, but also giving rise to a *Phialophora* synasexual morph. – Conidiophores erect, brown, cylindrical, 1–2-septate, 15–30 × 2 µm, giving rise to 1–4 conidiogenous cells. – Conidiogenous cells pale brown, smooth, cylindrical, straight to curved, 8–12 × 2 µm, with prominent apical cylindrical collarettes, 2–3.5 µm long. – Conidia forming in slimy masses, hyaline, smooth, globose to clavate with truncate hilum, 0.5–1 µm diam., 2–3 × 2 µm.

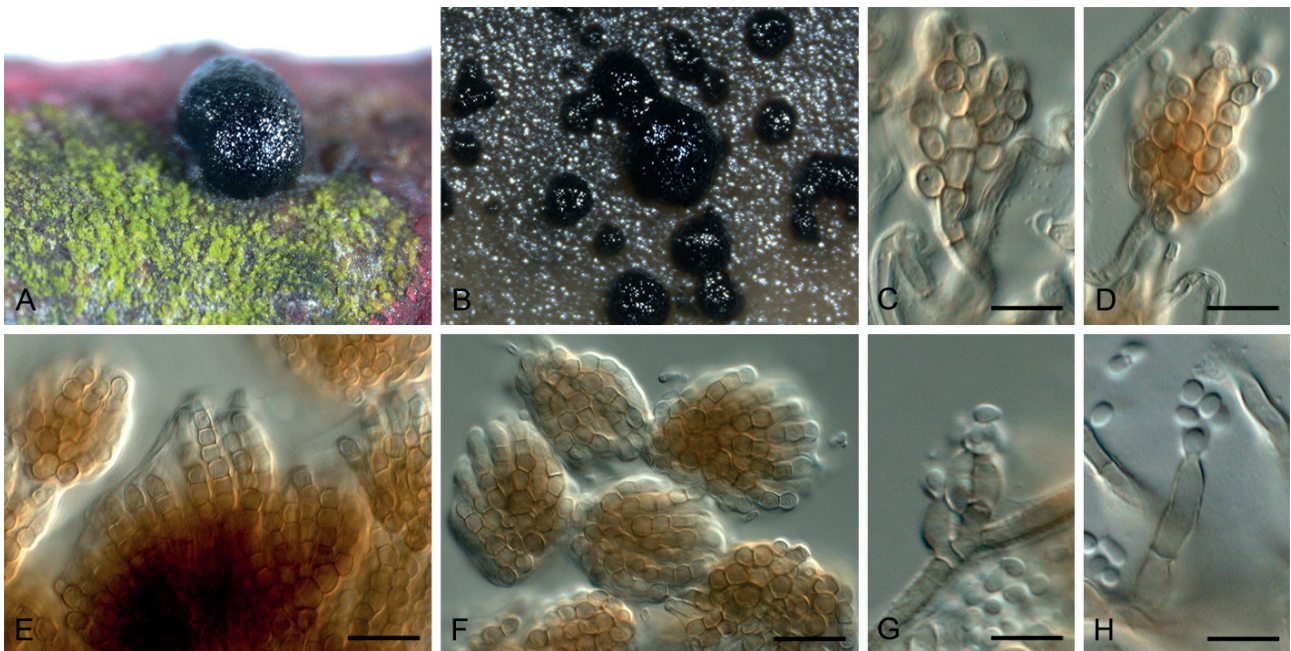
**Culture characteristics.** – Colonies spreading, with sparse aerial mycelium and even, smooth margins, reaching 30 mm diam. after 1 month at 25 °C. On OA surface brown vinaceous with diffuse honey pigment; on PDA surface iron-grey, reverse olivaceous grey; on MEA surface iron-grey, reverse olivaceous grey.

**Material examined.** – GERMANY, on branches of *Fagus sylvatica* (Fagaceae), 29 Mar. 2014, leg. R. K. Schumacher, diverse collections, CPC 24603 = CBS 139999, CPC 24605, CPC 24607, CPC 24611.

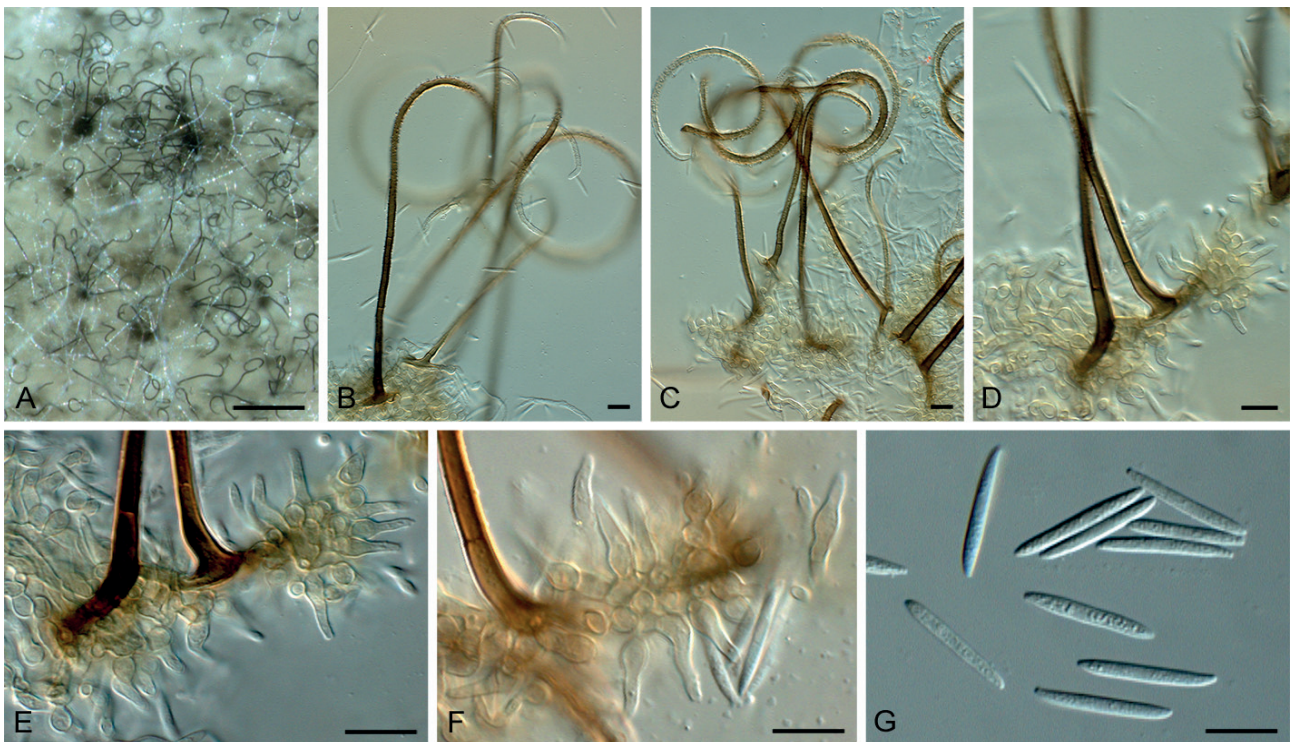
**Notes.** – *Cheirospora botryospora* (Helotiales, Leotiomyces) is common on branches of *Fagus sylvatica* in Europe (Sutton 1980). Although its phylogenetic position has remained unclear until now, we were surprised to find that it formed a *Phialophora* synasexual morph in culture. The LSU sequences of the strains place it in *Helotiales*, with *Acephala applanata* (GenBank KF951051) as closest sister (Fig. 1).

The commonly cited combination “*C. botryospora* (Mont.) Berk. & Broome” was never proposed by the authors (Berkeley & Broome 1850), as they in fact cite the combination proposed by Fries (1849), which is valid. However, they do cite the incorrect page, namely p. 499, whereas Fries proposed the combination on p. 508. Because of this error, subsequent workers assumed Fries never introduced the combination, and erroneously attributed it to M. J. Berkeley & C. E. Broome.

**Authors:** P. W. Crous & R. K. Schumacher



**Fig. 4.** *Cheirospora botryospora* (CBS 139999). **A.** Conidioma on twig. **B.** Conidiomata on OA. **C–F.** Conidiogenous cells giving rise to botryose conidia. **G, H.** Conidiogenous cells with *Phialophora* synasexual morph. Scale bars = 10 µm.



**Fig. 5.** *Circinotrichum maculiforme* (CPC 24566). **A.** Colony on OA. **B–F.** Setae and conidiogenous cells. **G.** Conidia. Scale bars: A = 350 µm, all others = 10 µm.

***Circinotrichum maculiforme*** Nees, *Syst. Pilze* (Würzburg): 19, tab. 5, fig. 66. 1817. – Fig. 5

**Description.** – Mycelium consisting of hyaline, smooth, septate, branched, 1.5–2 µm diam. hyphae. – **Setae** erect, solitary or in clusters of 2–4, evenly distributed throughout colony, base with a T-cell giving rise to a network of aggregated conidiogenous cells; stipe brown, thick-walled, 4–8-septate, up to 350 µm long, lower part verruculose, becoming prominently warty (1–5 µm diam.), towards obtusely rounded apex, 2–3 µm diam.; upper part coiled in 1–2 coiled loops. – **Conidiophores** reduced to conidiogenous cells, or with a single supporting cell. – **Conidiogenous cells** aggregated in tight clusters around the base of setae, medium brown, smooth, covered with mucoid sheath, ampulliform, apex with a series of what appears to be percurrent proliferations or scars, 8–14 × 3–5 µm. – **Conidia** aggregated in mucoid clusters at apices of conidiogenous cells, hyaline smooth, granular, fusiform, straight, apex subobtuse, base with small truncate scar, 0.5 µm diam., straight to slightly curved, (10–)15–17 × (1.5–)2 µm.

**Culture characteristics.** – Colonies reaching 30–50 mm diam. after 1 month at 25 °C, with sparse aerial mycelium and feathery margins. On MEA surface dirty white, reverse sienna; on OA surface honey; on PDA surface and reverse buff.

**Material examined.** – CZECH REPUBLIC, near Brno, Pouzdrany steppe, on twig of *Loranthus europaeus* (*Loranthaceae*), growing on twigs of *Quercus* sp. (*Fagaceae*), 26 Mar. 2014, leg. R. Gebauer (CBS H-22253, culture CPC 24566 = CBS 140016).

**Notes.** – The genus *Circinotrichum* (*Xylariaceae*, *Xylariales*) is based on *C. maculiforme*, a species that occurs commonly on leaves of *Quercus*, *Platanus*, and leaf litter in Europe and the USA (Pirozynski 1962, Ellis 1971). Based on the phylogenetic tree derived from LSU data (Fig. 1), the genus appears to be paraphyletic, and will be treated in more detail in a separate study.

**Authors:** P. W. Crous & R. K. Schumacher

***Coniella peruensis*** Crous & M. Chr., **sp. nov.** – Fig. 6 MycoBank MB809672

**Description.** – Conidiomata pycnidial, globose to depressed, up to 200 µm wide, initially appearing hyaline with a dark brown, internal conidial mass, becoming brown with age; ostiole central, 10–20 µm wide; wall 10–15 µm thick, consisting of 2–4 layers of pale to medium brown *textura angularis*; conidiomata containing a basal, central cushion of hyaline cells that give rise to hy-

aline conidiophores. – **Conidiophores** densely aggregated, slender, subulate, simple, frequently branched above, reduced to conidiogenous cells, or with a supporting cell, 10–25 × (2)3–4 µm. – **Conidiogenous cells** simple, tapering, hyaline, smooth, 10–20 × 3–4 µm, 1–1.5 µm wide at apex, surrounded by a gelatinous coating, apex with visible periclinal thickening, rarely with percurrent proliferation. – **Conidia** ellipsoidal to limoniform, apices tapering, subobtusely rounded, tapering from middle towards a narrowly truncate base, medium brown, multi-guttulate, wall darker brown than medium brown body of conidium, (9)10–11(12) × (6.5)7(8) µm.

**Etymology.** – Named for the country where it was collected, Peru.

**Culture characteristics.** – Colonies spreading with sparse aerial mycelium and smooth, even margins. On OA surface with black conidiomata and zones of orange. On PDA with black conidiomata and zones of pale luteous, similar in reverse. On MEA surface black due to sporulation, with zones of pale luteous, similar in reverse.

**Material examined.** – PERU, Iquitos, from soil of rain forest, leg. M. Christensen (holotype CBS H-2194, culture ex-type CBS 110394 = RMF 74.01).

**Notes.** – The genus *Coniella* (*Schizoparmaceae*, *Diaporthales*, *Sordariomycetes*) includes approximately 30 species, many of which are soil-borne, and well-known as leaf, stem, and root pathogens of a diverse range of hosts (Sutton 1980, van Niekerk et al. 2004, Miranda et al. 2012). The culture on which the description is based was originally identified as *Coniella fragariae*, which has conidia that are 7–12.5 × 4–10 µm. *Coniella peruensis* is phylogenetically distinct from *C. fragariae* (Fig. 1), and also has somewhat smaller conidia (Crous et al. 2014a).

**Authors:** P. W. Crous & M. Christensen

***Curreya acaciae*** Crous & M.J. Wingf., **sp. nov.** – Fig. 7 MycoBank MB812523

**Description.** – Conidiomata brown, immersed, globose, up to 300 µm diam., with 1–3 ostioles, non- to semi-papillate; wall of 3–6 layers of brown *textura angularis*. – **Conidiophores** reduced to conidiogenous cells. – **Conidiogenous cells** lining the inner cavity, hyaline, smooth, ampulliform, 5–10 × 3–4 µm, apex with conspicuous periclinal thickening, or with tightly aggregated percurrent proliferations. – **Conidia** solitary, aseptate, ellipsoidal, hyaline, becoming brown, guttulate, smooth-walled, apex obtuse, base truncate, 1 µm diam., (4)4.5–5.5(6) × (2.5)3 µm.

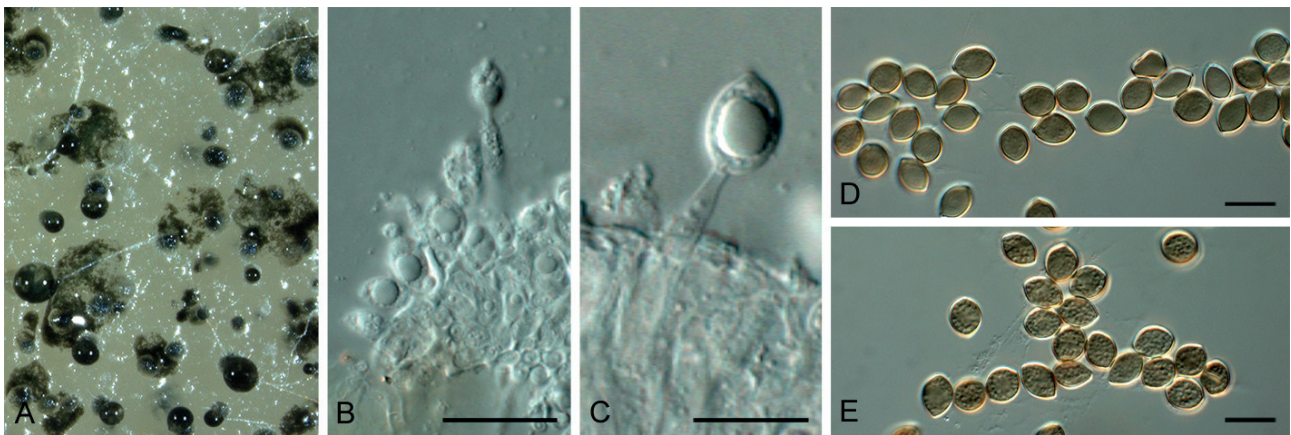


Fig. 6. *Coniella peruensis* (CBS 110394). A. Colony on OA. B, C. Conidiogenous cells. D, E. Conidia. Scale bars = 10 µm.

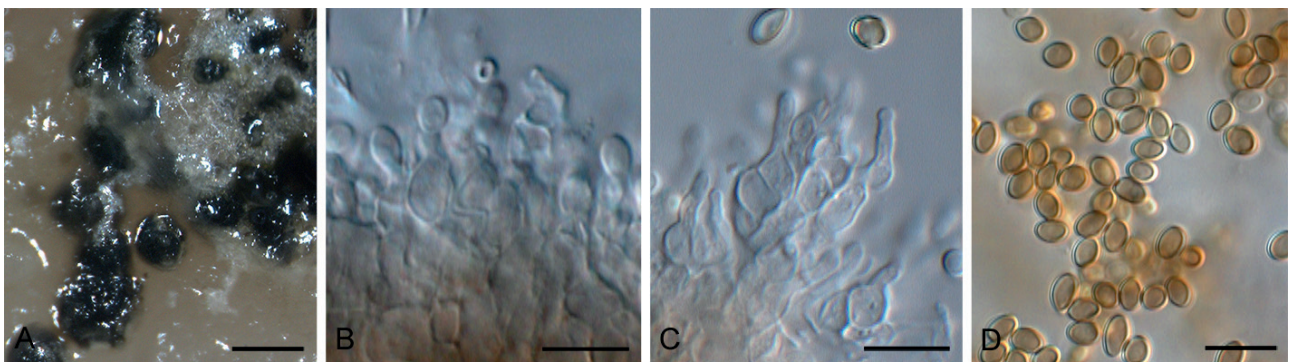


Fig. 7. *Curreya acacia* (CBS 140000). A. Conidiomata on OA. B, C. Conidiogenous cells. D. Conidia. Scale bars = 10 µm.

**Etymology.** – The name reflects the host genus *Acacia* from which this fungus was isolated.

**Culture characteristics.** – Colonies spreading, erumpent, with moderate aerial mycelium and even, smooth margins, reaching 40 mm diam. after 1 month at 25 °C. On OA surface dirty white to buff; on MEA surface buff, reverse honey; on PDA surface honey, reverse isabelline.

**Material examined.** – MALAYSIA, Sabah, on dead leaves of *Acacia mangium* (*Fabaceae*), May 2014, leg. M. J. Wingfield (holotype CBS H-22254, culture ex-type CPC 24801 = CBS 140000; CPC 24802).

**Notes.** – *Curreya* has been classified in *Cucurbitariaceae* (*Pleosporales*, *Dothideomycetes*) (Zhang et al. 2012, Doilom et al. 2013). Presently the type species of *Curreya*, *C. conorum* is not known from culture, and hence this classification remains unconfirmed (Crous et al. 2011 c). *Curreya acaciae* is phylogenetically related and morphologically similar to other asexual morphs presently known in the genus, and is added as a novel taxon, differing

based on its DNA phylogeny and conidial dimensions from other known taxa (Fig. 1).

*Authors:* P. W. Crous & M. J. Wingfield

***Cyphellophoriella* Crous & A. J. Smith, gen. nov.**  
Mycobank MB812524

**Description.** – Mycelium consisting of smooth, pale brown, septate, branched, hyphae. – Conidiogenous bodies separate to aggregated. Initially a globose mother cell forms on hyphae, giving rise to globose to ampulliform, pale brown, smooth conidiogenous cells in a flower arrangement (like petals); conidiogenous cells tapering from globose base to thin apex, phialidic with minute periclinal thickening, but collarette not visible; outside of conidiogenous cells forming a collarette that encloses the conidiogenous cells like a tent, forming an outer collarette, brown, verruculose, that varies from subcylindrical to ampul-

liform; apex opening and exuding a slimy conidial mass. – Conidia solitary, hyaline to pale brown, smooth, spindle-shaped, curved, apex obtuse, base truncate.

**Etymology.** – Name reflects its morphological similarity to the genus *Cyphellophora*.

**Type species.** – *Cyphellophoriella pruni*.

***Cyphellophoriella pruni*** Crous & A. J. Smith, **sp. nov.** – Fig. 8

MycoBank MB812525

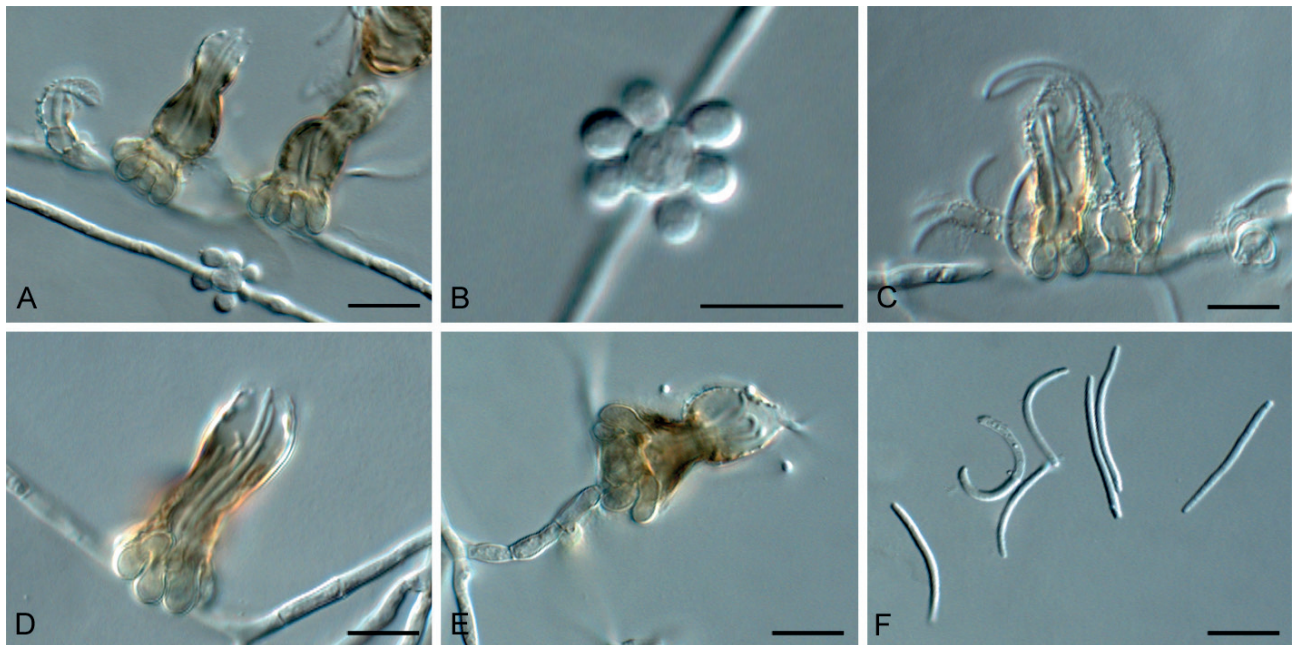
**Description.** – Mycelium consisting of smooth, pale brown, septate, branched, 2–3  $\mu\text{m}$  diam. hyphae. – Conidiogenous bodies separate to aggregated. Initially a globose mother cell, 3–4  $\mu\text{m}$  diam. forms on hyphae, giving rise to 4–14 globose to ampulliform, pale brown, smooth conidiogenous cells in a flower arrangement (like petals), 3–6  $\times$  2–4  $\mu\text{m}$ ; conidiogenous cells tapering from globose base to thin apex, 1  $\mu\text{m}$  diam., phialidic with minute periclinal thickening, but collarette not visible; outside of conidiogenous cells forming a tube that encloses the conidiogenous cells, brown, verruculose, varying from subcylindrical to ampulliform, 10–20  $\times$  8–13  $\mu\text{m}$ ; apex opening and exuding a slimy conidial mass. – Conidia solitary, hyaline to pale brown, smooth, spindle-shaped, curved, apex obtuse, base truncate, (13)15–18(22)  $\times$  1(1.5)  $\mu\text{m}$ .

**Etymology.** – Name reflects the host genus *Prunus*, from which this fungus was isolated.

**Culture characteristics.** – Colonies spreading, lacking aerial mycelium, with smooth, lobed margins, reaching 20 mm diam. after 1 month at 25 °C. On PDA surface and reverse olivaceous black; on OA surface olivaceous black; on MEA surface olivaceous grey, reverse iron grey.

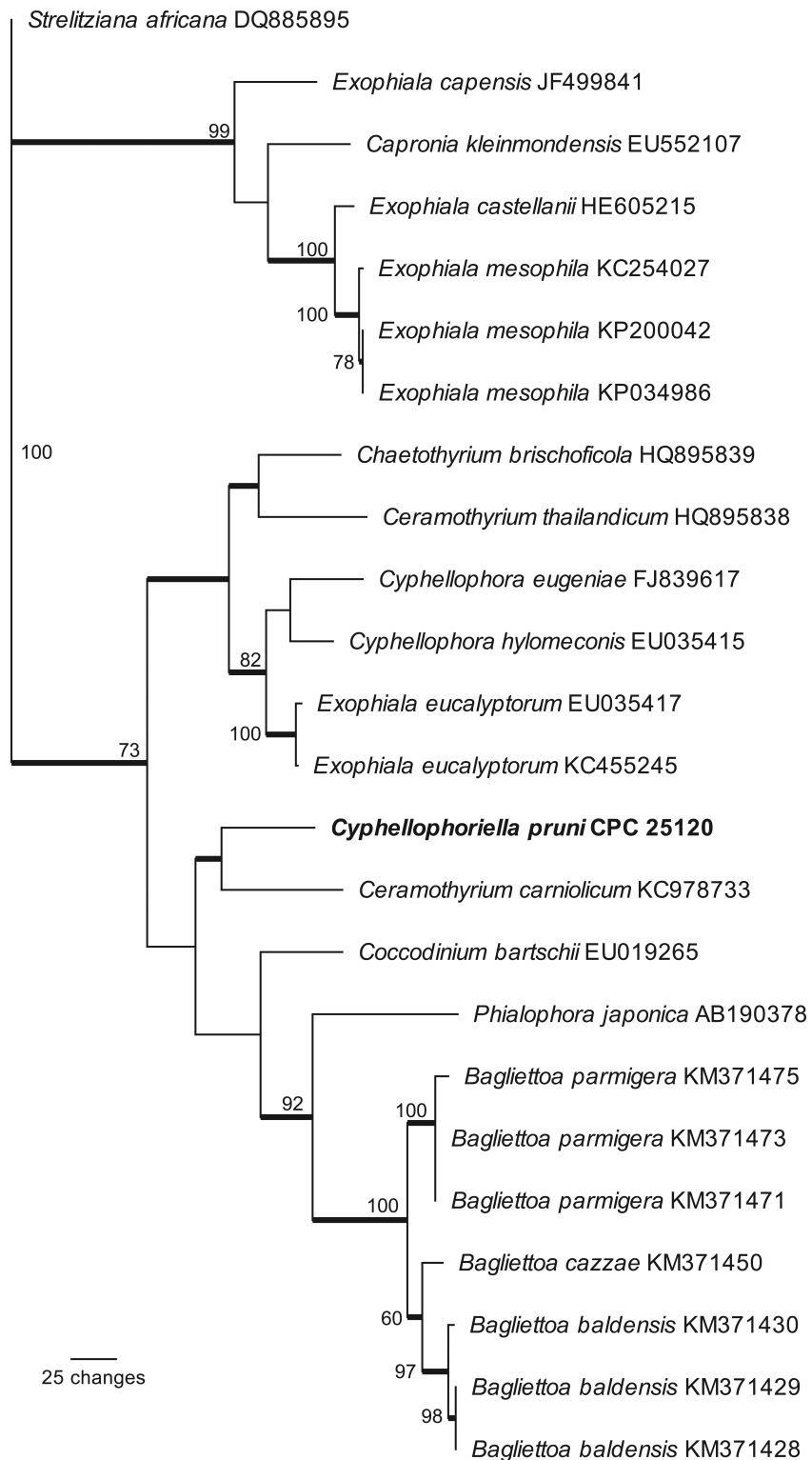
**Material examined.** – USA, California, Berkeley, on apparently healthy leaf of a *Prunus* sp. (*Rosaceae*), 26 March 2014, leg. A. J. Smith (holotype CBS H-22255, culture ex-type CPC 25120 = CBS 140001).

**Notes.** – *Cyphellophoriella* resembles the genus *Cyphellophora* (*Chaetothyriaceae*, *Chaetothyriales*, *Eurotiomycetes*), which is characterised by having phialides formed directly on hyphae (or with reduced conidiophores and collarettes), giving rise to multiseptate, curved conidia (Crous et al. 2007, 2009a, 2013b). *Cyphellophoriella* is primarily distinguished by its unique flower-like arrangement of conidiogenous cells, attached to a mother cell. *Cyphellophoriella* is also similar to *Polystrotrictus* (*P. fusarioides*, from palm leaf litter, Peru; Matsushima 1993), but distinct because the latter species has conidiophores that appear better differentiated on the mother cell, the rosette of conidiogenous cells are not surrounded with a collarette, and the conidia are broad and septate. Based on the ITS phylogeny (Fig. 9), *Cyphellophora* and *Cyphel-*



**Fig. 8.** *Cyphellophoriella pruni* (CBS 140001). **A–E.** Phialides enclosed in a long collarettes, developing around mother cell. **F.** Aseptate conidia. Scale bars = 10  $\mu\text{m}$ .





**Fig. 9.** The first of 12 equally most parsimonious trees obtained from a heuristic search with 100 random taxon additions of the ITS sequence alignment (Characters: 210 parsimony-informative, 230 constant, and 94 variable and parsimony-uninformative) using PAUP v. 4.0b10 (Swofford 2003). The scale bar shows 25 changes, and bootstrap support values from 1 000 replicates are shown at the nodes. Thickened lines indicate the strict consensus branches and the species treated here is printed in bold face. The tree was rooted to *Strelitziana africana* (GenBank accession DQ885895). Tree length = 962; CI = 0.568; RI = 0.695; RC = 0.395.

*lophoriella* are not congeneric and *Cyphellophoriella pruni* has *Ceratomyrium carniolicum* (GenBank KC978733) as closest sister.

Authors: P. W. Crous & A. J. Smith

***Diaporthe spartinicola*** Crous & R.K. Schumach., sp. nov. – Fig. 10  
MycoBank MB812526

**Description.** – Conidiomata pycnidial on SNA, sporulating poorly, eustromatic, convuluted, up to 300 µm diam., black erumpent; creamy conidial droplets exuding from central ostioles; walls consisting of 3–6 layers of brown *textura angularis*. Conidiophores hyaline, smooth, 1–3-septate, branched below, densely aggregated, cylindrical, straight to geniculate-sinuuous, 10–30 × 3–5 µm. Conidiogenous cells 10–17 × 2–3 µm, phialidic, cylindrical, terminal and intercalary, with slight taper towards apex, 1–1.5 µm diam., with visible periclinal thickening; collarette not flared, up to 1 µm long when present. Paraphyses not observed. Alpha conidia not observed in culture, but on host ovoid, hyaline, smooth, guttulate, 14–18.5 × 11–17 µm. Beta conidia spindle-shaped, aseptate, smooth, hyaline, apex subobtuse, base truncate, ta-

pering from lower third towards both ends, hooked, (9)11–13(15) × (1.5)2(2.5) µm.

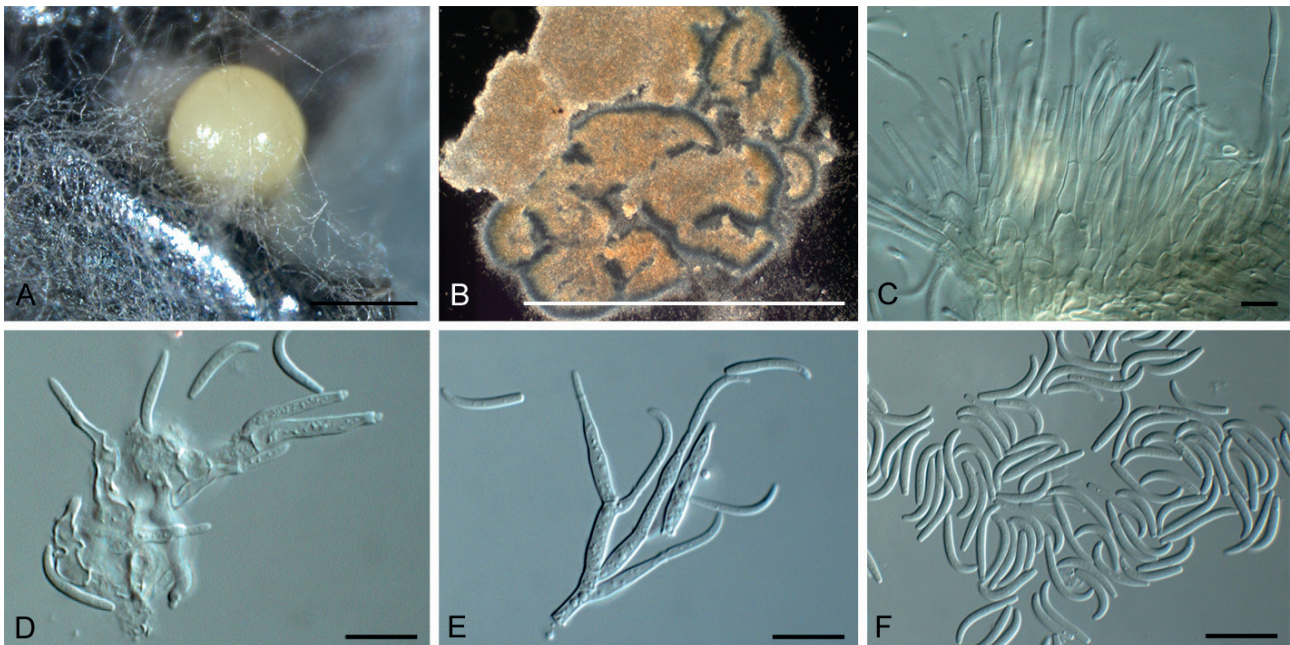
**Etymology.** – Name reflects the host genus *Spartium*, from which this fungus was collected.

**Culture characteristics.** – Colonies covering dish after 1 month at 25 °C, with moderate aerial mycelium. On PDA, OA and MEA surface sepia with zones of fawn, reverse chestnut.

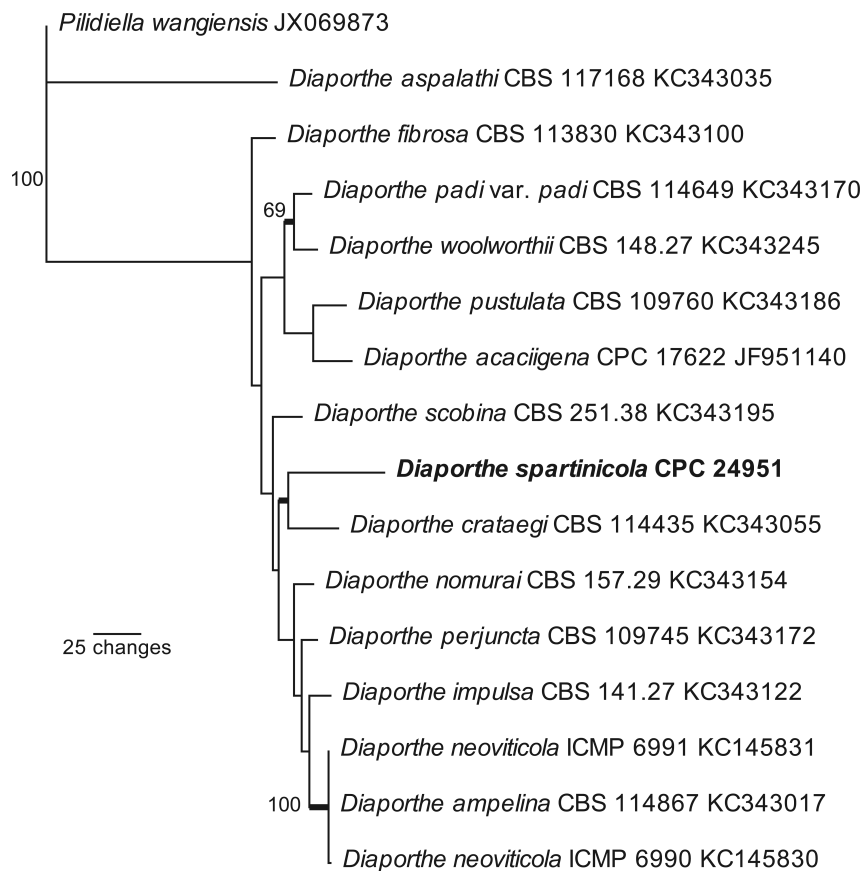
**Material examined.** – SPAIN, Jaén, Los Villares, 3°48'14.02"O, 37°39'31.29"N, alt. 970 m a.s.l., on stem of *Spartium junceum* (*Leguminosae*), 24 June 2014, leg. S. Tello (holotype CBS H-22256, culture ex-type CPC 24951 = CBS 140003).

**Notes.** – The material examined contains a coelomycete with alpha and beta conidia produced in the same conidiomata. The alpha conidia are ovoid to almost globose in shape, and unusual for species of *Diaporthe* (*Diaporthaceae*, *Diaporthales*, *Sordariomycetes*), which tend to have more fusoidal-ellipsoidal alpha conidia (Gomes et al. 2013, Thompson et al. 2015). Phylogenetically (ITS, Fig. 11), this fungus clusters with, but is not identical to, other species of *Diaporthe*; *D. crataegi* (GenBank KC343055) is its closest sister. In culture, however, only beta conidia could be induced. Alpha conidia of *D. spartinicola* are larger than those of *Phomopsis spartii* (10–11 × 2–2.5 µm) described by Uecker (1988).

Authors: P.W. Crous & R. K. Schumacher



**Fig. 10.** *Diaporthe spartinicola* (CBS 140003). **A.** Conidioma on PDA. **B.** Vertical section through multilocular conidioma. **C–E.** Conidiophores giving rise to conidia. **F.** Conidia. Scale bars = 10 µm.



**Fig. 11.** The first of 16 equally most parsimonious tree obtained from a heuristic search with 100 random taxon additions of the ITS sequence alignment (Characters: 77 parsimony-informative, 426 constant, and 107 variable and parsimony-uninformative) using PAUP v. 4.0b10 (Swofford 2003). The scale bar shows 25 changes, and bootstrap support values from 1 000 replicates are shown at the nodes. The species treated here is printed in bold face. Thickened lines indicate the strict consensus branches. The tree was rooted to *Pilidiella wangiensis* (GenBank accession JX069873). Tree length = 361; CI = 0.665; RI = 0.462; RC = 0.307.

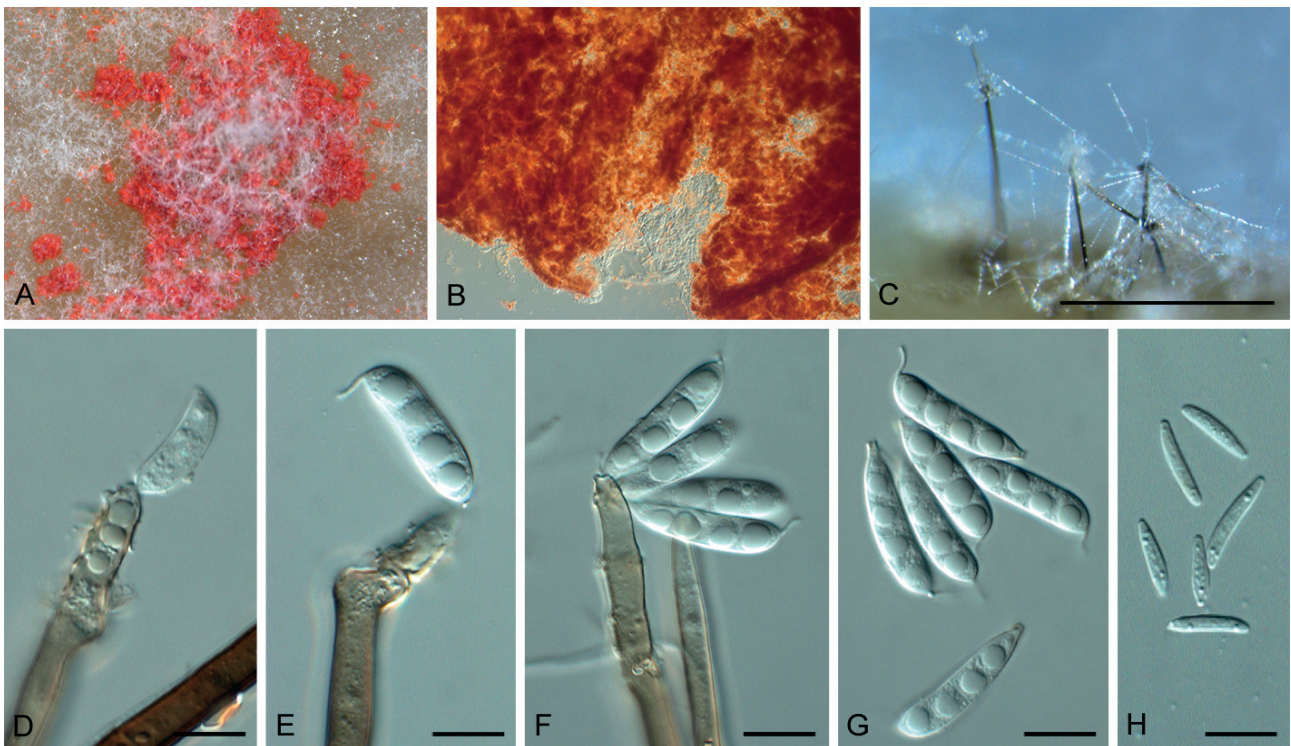
***Dictyochaeta triseptata*** (Matsush.) R.F. Castañeda, *Fungi Cubense* (La Habana): 8. 1986. – Fig. 12

Basionym. – *Codinaea triseptata* Matsush., *Matsush. Mycol. Mem.* 2: 4. 1981.

Description. – Mycelium consisting of hyaline, branched, septate, 1.5–3 µm diam. hyphae. – Conidiophores dimorphic. – Macroconidiophores singular, erect, subcylindrical, straight to flexuous, unbranched, base bulbous (7–10 µm diam.) or not, with or without rhizoids. Stipe thick-walled, dark brown, granular, 150–600 × 6–10 µm, multiseptate, septa 15–35 µm apart. – Macroconidiogenous cells terminal, integrated, pale to medium brown, finely verruculose, subcylindrical, 20–120 × 5–6 µm; loci aggregated at apex, phialidic, rarely with cup-shaped, flared collarette, up to 2 µm diam., and 2 µm tall, mostly absent. – Macroconidia aggregated in mucoid

mass, fusoidal-ellipsoidal, hyaline, smooth, granular with large guttules, (1)3-septate, (24)25–27(28) × (6)7(9) µm, apex obtuse, with central appendage, 4–6 × 1 µm, base truncate, 2 µm diam., with minute pale brown collarette, and excentric appendage, 3–4 × 1 µm. – Microconidiophores solitary or fasciculate (–4), subcylindrical, straight to curved, unbranched, 2–5-septate, pale brown, finely verruculose, 30–60 × 3–4 µm. – Microconidiogenous cells terminal, integrated, subcylindrical, pale brown, finely verruculose, 10–20 × 3–4 µm, with one to several phialidic loci, cup-shaped, flared, up to 2 µm diam. and deep. – Microconidia solitary, hyaline, smooth, guttulate, fusoidal-ellipsoidal, slightly curved, 7–12 × 2 µm, apex subobtuse, base truncate, 1 µm diam.

Culture characteristics. – Colonies spreading, with sparse aerial mycelium and feathery margin, reaching 40 mm diam. after 1 month at



**Fig. 12.** *Dictyochaeta triseptata* (CBS 140002). **A, B.** Colony on OA producing conspicuous red pigment (crystals) in culture. **C.** Erect conidiophores. **D–F.** Conidiogenous cells with inconspicuous cup-shaped collarettes. **G.** Conidia with setulae. **H.** Microconidia. Scale bars: C = 400  $\mu\text{m}$ , all others = 10  $\mu\text{m}$ .

25 °C. On PDA surface buff, with vinaceous exudate; reverse cinnamon in centre, buff in outer region. On MEA surface buff, reverse apricot. On OA surface honey.

**Material examined.** – MALAYSIA, Sabah, on *Eucalyptus* twigs (*Myrtaceae*), May 2014, leg. M. J. Wingfield, culture CPC 24797 = CBS 140002.

**Notes.** – *Codinaea triseptata* was originally described from litter collected in the National Forest of Alabama, USA, having conidia 21–30  $\times$  6–7.5  $\mu\text{m}$  (Matsushima 1981). Later, Castañeda-Ruiz (1986) placed this taxon in *Dictyochaeta*, based on a collection made in Cuba, having larger conidia, 24.5–37  $\times$  7–8  $\mu\text{m}$ . This is the first report of a microconidial morph for *D. triseptata*, though we suspect that this taxon represents an unresolved species complex.

Réblová (2000) separated *Codinaea* from *Dictyochaeta* (*Chaetosphaeriaceae*, *Chaetosphaeriales*, *Sordariomycetes*) because the latter genus has conidia lacking setulae, and also because the morphology correlated with the phylogenetic data available at that time. However, in a comparative study of several genera in this complex, Crous et al. (2012 b) showed that conidial appendages were not features

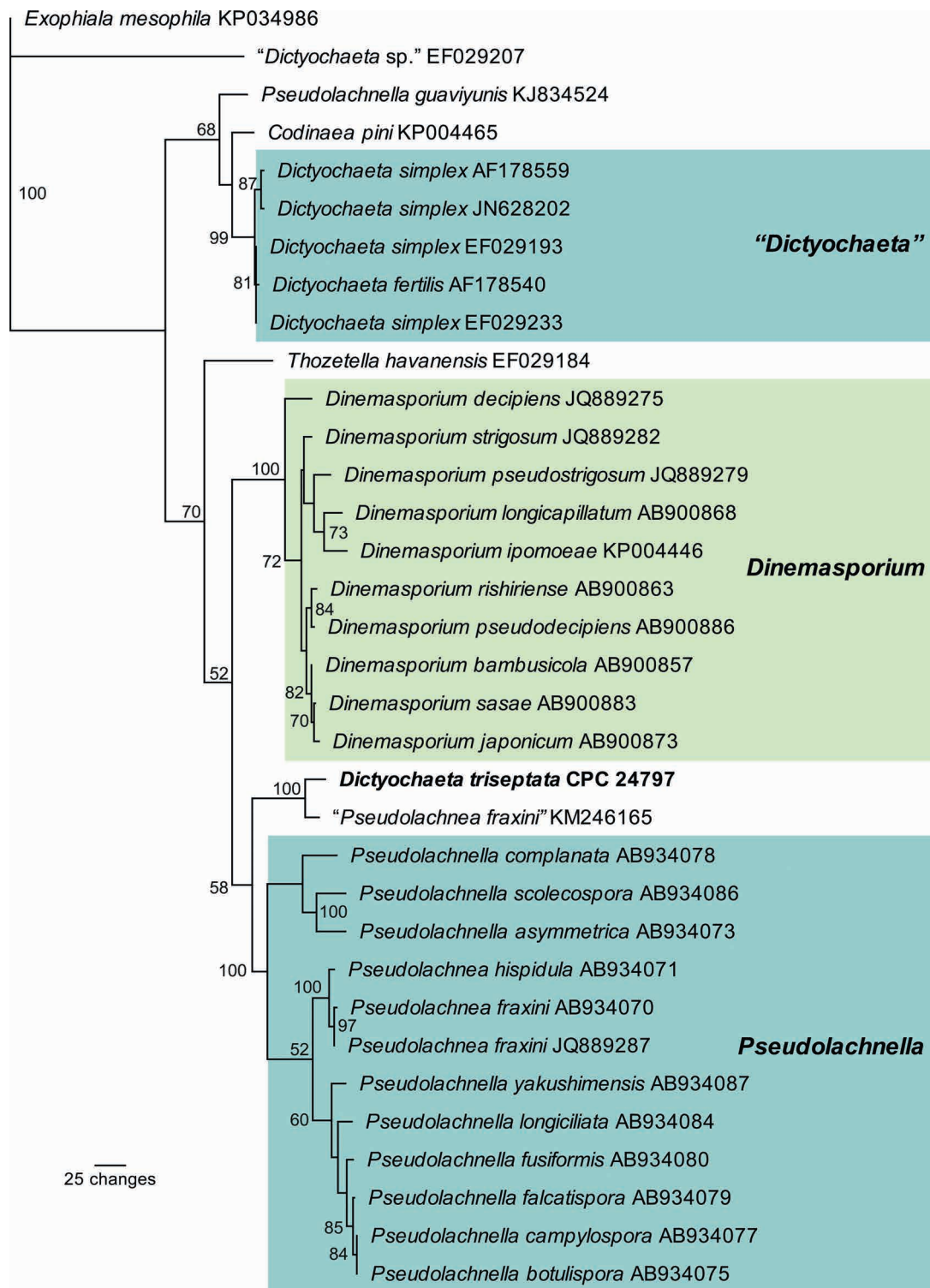
that could be employed at generic level. Furthermore, *Chaetosphaeria* (incl. *Ascocodinaea* and *Striatosphaeria*) sexual morphs have been linked to several dictyochaeta-like genera, and other than *Codinaea*, the genus *Dictyochaeta* also needs to be compared with *Codinaeopsis*, *Dictyochaetopsis*, *Menispora*, *Menisporella*, *Menisporopsis*, *Paracera-tocladium* and *Phialogeniculata*. Phylogenetic data in this study (ITS, Fig. 13) suggested that more than one genus could be involved and clearly this complex requires revision based on fresh collections and DNA sequence comparisons.

*Authors:* P. W. Crous & M. J. Wingfield

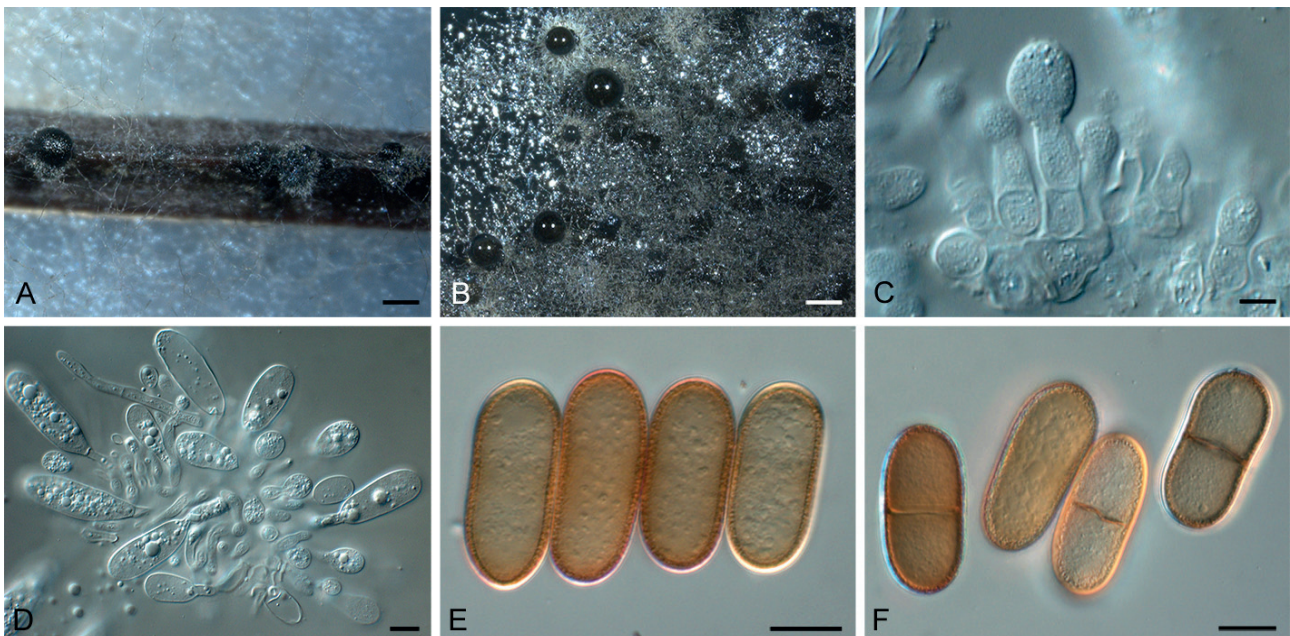
***Dothiorella ulmacea* Crous & R.K. Schumach., sp. nov.** – Fig. 14

Mycobank MB812527

**Description.** – Conidiomata solitary, up to 250  $\mu\text{m}$  diam., erumpent, dark brown to black, globose, somewhat papillate with central ostiole; wall of 2–3 layers of dark brown *textura angularis*. – Conidiophores reduced to conidiogenous cells lining the inner cavity. – Conidiogenous



**Fig. 13.** The single most parsimonious tree obtained from a heuristic search with 100 random taxon additions of the ITS sequence alignment (Characters: 152 parsimony-informative, 227 constant, and 107 variable and parsimony-uninformative) using PAUP v. 4.0b10 (Swofford 2003). The scale bar shows 25 changes, and bootstrap support values from 1 000 replicates are shown at the nodes. The species treated here is printed in bold face. The genera *Dictyochaeta*, *Dinemasporium* and *Pseudolachnella* are indicated with coloured blocks. The tree was rooted to *Exophiala mesophila* (GenBank accession KP034986). Tree length = 772; CI = 0.587; RI = 0.773; RC = 0.454.



**Fig. 14.** *Dothiorella ulmacea* (CBS 138855). **A.** Conidiomata on PNA. **B.** Conidiomata on OA. **C, D.** Conidiogenous cells. **E, F.** Conidia. Scale bars: A, B = 250  $\mu$ m, all others = 10  $\mu$ m.

cells hyaline, smooth, ampulliform to subcylindrical, 5–15  $\times$  4–5  $\mu$ m; proliferating several times percurrently near apex. – Conidia solitary, subcylindrical, hyaline when immature, becoming brown while attached to conidiogenous cells, thick-walled, guttulate to granular, surface verruculose, with obtuse ends, straight, becoming 1-septate with age, (28)30–32(37)  $\times$  (12)13–14(15)  $\mu$ m.

**Etyymology.** – Name reflects the host genus *Ulmus*, from which this fungus was isolated.

**Culture characteristics.** – Colonies covering dish at 1 month at 25  $^{\circ}$ C, with fluffy aerial mycelium. On PDA surface and reverse iron grey; on OA surface iron grey with patches of olivaceous grey; on MEA surface olivaceous grey, iron grey at margin, and in reverse.

**Material examined.** – GERMANY, on a twig of *Ulmus laevis* (*Ulmaceae*), 1 Mar. 2014, leg. R. K. Schumacher (holotype CBS H-22257, culture ex-type CPC 24416 = CBS 138855); on twigs of *Ulmus laevis*, 9 July 2014, leg. R. K. Schumacher (CBS H-22282, culture CPC 24945 = CBS 140005).

**Notes.** – The genus *Dothiorella* (*Botryosphaeriaceae*, *Botryosphaeriales*, *Dothideomycetes*) is characterized by having species with conidia that become pigmented and 1-septate while they are still attached to conidiogenous cells (Abdollahzadeh et al. 2014). Because of wide host ranges and morphological plasticity, identifying species in this genus has become almost impossible without the aid of molecular data (Slippers et al. 2014).

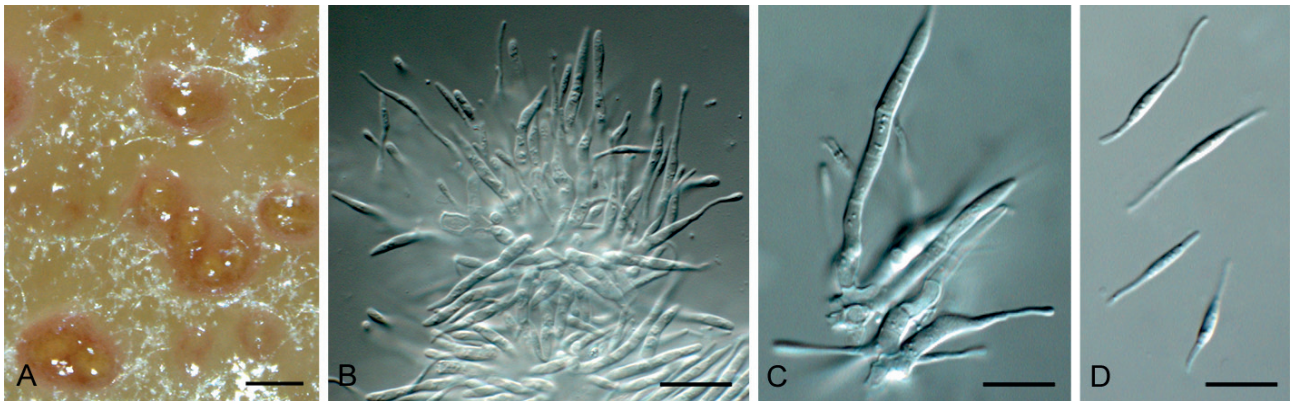
In a recent revision of the *Botryosphaeriales* known from culture, Phillips et al. (2013) listed *Dothiorella sarmentorum* from *Ulmus* [conidia (17.5)21.5–22(25)  $\times$  (8)9.5–10(11.5)  $\mu$ m]. *Diplodia ulmi* (conidia 15–17  $\times$  9–10  $\mu$ m; Dearness 1916), has not been studied in culture, and needs to be recollected and epitypified (Phillips et al. 2005, 2013). *Dothiorella ulmacea* appears distinct based on conidium dimensions and is also distinct from those taxa currently known from DNA sequence (Fig. 1).

**Authors:** P. W. Crous & R. K. Schumacher

***Eleutheromyces pseudosubulatus* Crous & Giraldo, sp. nov.** – Fig. 15

Mycobank MB812528

**Description.** – Fungicolous. – Conidiomata pycnidial, scattered to densely gregarious, seemingly superficial but innate erumpent, globose, up to 200  $\mu$ m diam., unilocular, glabrous, gelatinous, salmon with ostiole pale luteous; wall up to 30  $\mu$ m thick, of *textura angularis*, cells thick-walled, pale brown to pale yellow; ostiole central, circular. – Conidiophores arising all around the cavity of the conidioma, cylindrical, branched mostly at the base, septate, often variously curved, colourless, smooth, up to 40  $\mu$ m long, invested in mucus. – Conidiogenous cells cylindrical, integrated, colourless, smooth-walled, 3–10



**Fig. 15.** *Eleutheromyces pseudosubulatus* (CBS 458.88). **A.** Conidiomata on OA. **B, C.** Conidiophores. **D.** Conidia. Scale bars: A = 200 µm, B–D = 10 µm.

× 2.5–4 µm. – Conidia ellipsoidal or lenticular, unicellular, hyaline, 5–6 × 1.5–2 µm, one appendage at each end delimited by a septum; appendages tubular, attenuated; apical appendage 7–10 µm long; basal appendage 5–6 µm long.

**Etymology.** – Name reflects its morphological similarity with *Eleutheromyces subulatus*.

**Culture characteristics.** – Colonies flat, spreading, with sparse to moderate aerial mycelium and even, lobate margins. Colonies on PDA reaching 15 mm diam., and on OA reaching 30 mm after 2 weeks. On OA surface apricot. On PDA surface salmon in centre, dirty white in outer region, with pale luteous zone in agar; reverse pale luteous. On MEA surface rose, reverse scarlet.

**Material examined.** – GERMANY, Lkr. Bad Tölz/Wolfratshausen, E of Pupplinger Au, on *Lactarius scrobiculatus* (Russulaceae, Fungi), 3 Oct. 1986, leg. W. Helfer (holotype REG M127/86, culture ex-type CBS 458.88).

**Notes.** – Species of *Eleutheromyces* are fungicolous, growing on agarics. The type species, *E. subulatus* was recently epitypified with the strain CBS 113.86 (*incertae sedis, Helotiales*) (Crous et al. 2014 a). Two cultures listed in the CBS collection as *E. subulatus* (CBS 458.88 and CBS 139.90) were found to be phylogenetically (97 % identical on ITS, 543/561 characters) and morphologically distinct (Crous et al. 2014 a). *Eleutheromyces pseudosubulatus* (CBS 458.88) differs from *E. subulatus* in having narrower conidia, and longer appendages and they cluster in *Helotiales* (Fig. 1).

**Authors:** P. W. Crous & A. Giraldo

***Flammocладиaceae*** Crous, L. Lombard & R.K. Schumach., **fam. nov.**  
Mycobank MB812529

**Description.** – Ascomata perithecial, pale luteous to yellow-orange, aggregated in clus-

ters, linked by a stromatic base, covered in a dirty white crustose layer, not discolouring in 3 % KOH, turning pale luteous to dirty white, with a characteristic papillate, periphysate ostiolar area; wall of smooth, 3–4 layers of subhyaline *textura angularis*. – **Asci** fasciculate, hyaline, smooth, fusoidal-ellipsoidal to subclavate, unitunicate, 8-spored. – **Ascospores** hyaline, fusoidal-ellipsoidal with obtuse ends, septate, warty, not to slightly constricted at septa. – **Conidiomata** sporodochial, determinate, hyaline, becoming orange. – **Conidiophores** subcylindrical, septate, branched. – **Conidiogenous cells** subcylindrical, terminal and intercalary, hyaline, smooth, proliferating sympodially at apex. – **Conidia** slimy, solitary, hyaline, smooth, granular to guttulate, straight to gently curved, subcylindrical to narrowly obclavate.

**Type genus.** – *Flammocладиella* Crous, L. Lombard & R.K. Schumach.

**Type species.** – *Flammocладиella aceris*.

***Flammocладиella*** Crous, L. Lombard & R.K. Schumach., **gen. nov.**  
Mycobank MB812530

**Description.** – **Conidiomata** sporodochial, determinate, sporulating in orange, erect flame-like masses. Stroma of hyaline mycelium, hyphae smooth, branched. – **Conidiophores** subcylindrical, straight to flexuous, septate, branched. – **Conidiogenous cells** subcylindrical, terminal and intercalary, hyaline, smooth, proliferating sympodially at apex. – **Conidia** slimy, solitary, hyaline, smooth, granular to guttulate, straight to gently curved, subcylindrical to narrowly obclavate, apex obtuse, base long obconically truncate to truncate. – **Ascomata** perithecial, pale luteous to yellow-orange, aggregated

in clusters, linked by a stromatic base, covered in a dirty white crustose layer, not discolouring in 3 % KOH, turning pale luteous to dirty white, with a characteristic papillate, periphysate ostiolar area; wall of smooth, 3–4 layers of subhyaline *textura angularis*. – Ascifasciculate, hyaline, smooth, fusoid-ellipsoidal to subclavate, apical mechanism not staining in Melzer's reagent, unitunicate, 8-spored. – Ascospores hyaline, fusoid-ellipsoidal with obtuse ends, septate, warty, not to slightly constricted at septa, guttulate to granular.

Type species. – *Flammoclaidiella aceris*.

Etymology. Name reflects the flame-like conidial masses formed on the sporodochia.

***Flammoclaidiella aceris*** Crous, L. Lombard & R.K. Schumach., **sp. nov.** – Fig. 16  
MycoBank MB812531

Description. – Conidiomata on OA forming sporodochia, sporulating in orange, erect flame-like masses, up to 250 µm diam. – Stroma of hyaline mycelium, hyphae smooth, branched, 3–3.5 µm diam. – Conidiophores subcylindrical, straight to flexuous, 2–6-septate, branched, 10–70 × 2–3 µm. – Conidiogenous cells subcylindrical, terminal and intercalary, hyaline, smooth, 10–50 × 2–3 µm, proliferating sympodially at apex. – Conidia solitary, hyaline, smooth, granular to

guttulate, straight to gently curved, subcylindrical to narrowly obclavate, apex obtuse, base long obconically truncate to truncate, (30)45–60(75) × 2.5–3(3.5) µm. – Ascicata perithecial, pale luteous to yellow-orange, aggregated in clusters of up to 10, linked by a stromatic base, covered in a dirty white crustose layer, not discolouring in 3 % KOH, turning pale luteous to dirty white, up to 250 µm diam., with a characteristic papillate, periphysate ostiolar area, up to 130 µm diam.; wall of smooth, 3–4 layers of subhyaline *textura angularis* (up to 20 µm diam.). – Ascifasciculate, hyaline, smooth, fusoid-ellipsoidal to subclavate, apical mechanism not staining in Melzer's reagent, unitunicate, 60–120 × 12–15 µm, 8-spored, with orange droplets among the asci. – Ascospores 2–3-seriate in asci, hyaline, fusoid-ellipsoidal with obtuse ends, widest in the middle, 3-septate, warty, not to slightly constricted at septa, cells with a large guttule, granular, (18)20–28(35) × (5)6–7 µm.

Etymology. Name reflects the host genus from which it was isolated, *Acer*.

Culture characteristics. – Colonies slow-growing, reaching 7 mm diam. after 2 weeks at 25 °C in the dark, with sparse aerial mycelium and smooth margins; surface and reverse salmon.

Material examined. – GERMANY, on twigs of *Acer platanoides* (*Sapindaceae*), 23 Feb. 2014, leg. R. K. Schumacher (holotype CBS H-22263, culture ex-type CPC 24422 = CBS 138906, CPC 24423).

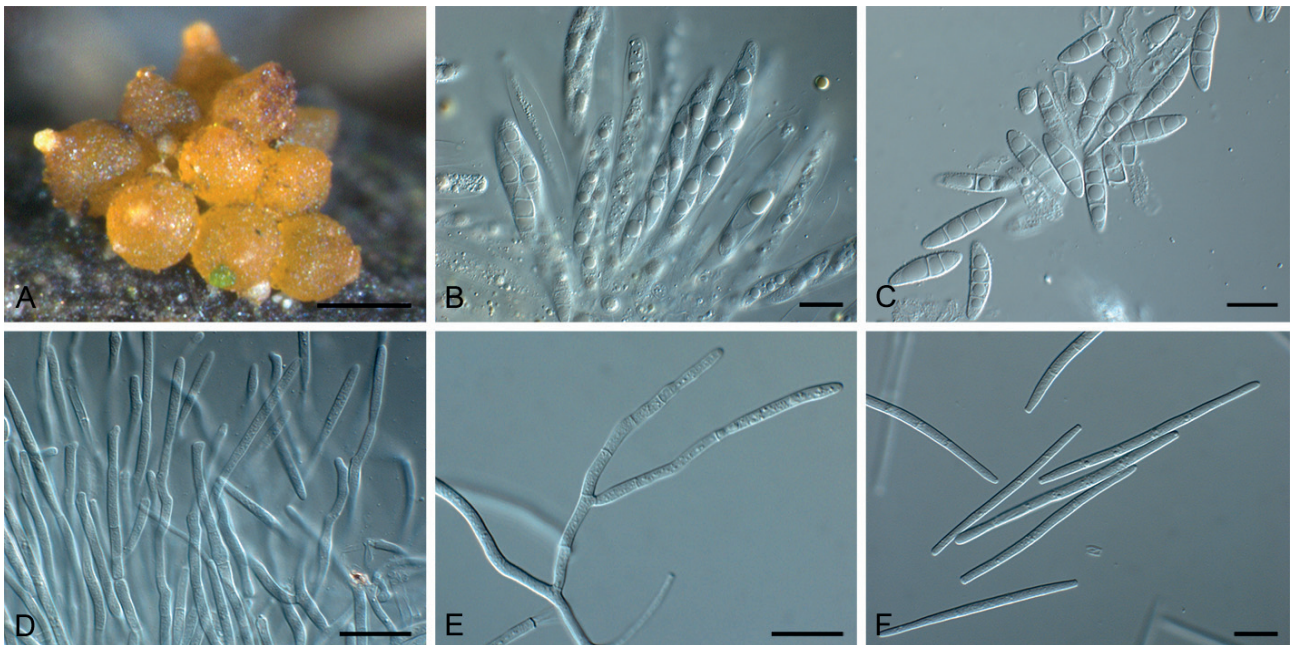
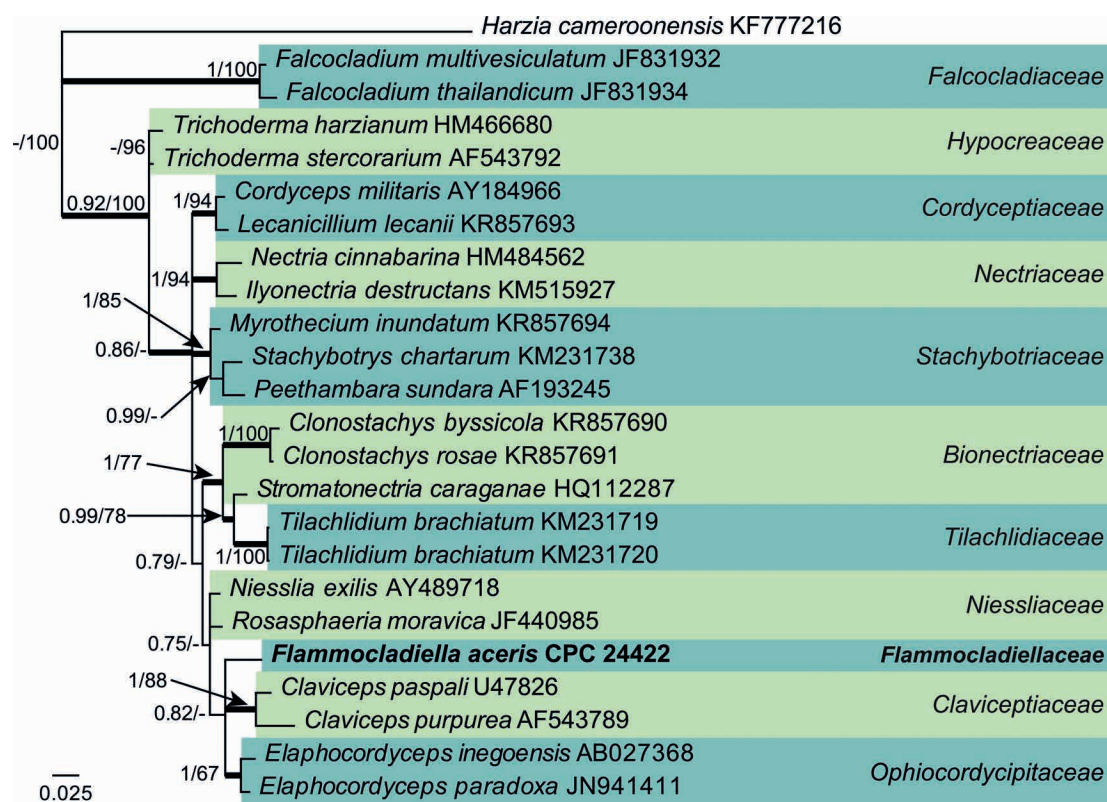


Fig. 16. *Flammoclaidiella aceris* (CBS 138906). A. Ascogonia arranged in rosette on host tissue. B. Asci. C. Ascospores. D, E. Conidiophores with conidiogenous cells. F. Conidia. Scale bars: A = 250 µm, all others = 10 µm.





**Fig. 17.** Consensus phylogram (50 % majority rule) of 3 078 trees resulting from a Bayesian analysis of the LSU sequence alignment (205 unique site patterns; 196 parsimony informative characters). Bayesian posterior probabilities (BPP) and parsimony bootstrap support values (PBS) are indicated at the nodes (BPP/PBS) and the scale bar represents the expected changes per site. Branches also present in the strict consensus parsimony tree are thickened and families are indicated to the right of the tree. The species and family treated here is shown in **bold** face. The tree was rooted to *Harzia cameroonensis* (GenBank KF777216).

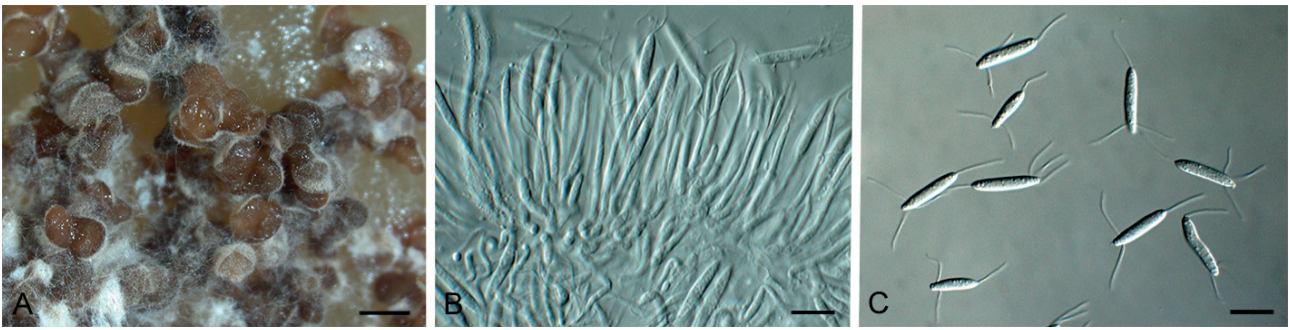
Notes. – *Flammocladiella*, based on *F. aceris*, is introduced here for a fungus growing on twigs of *Acer platanoides*. This genus can be distinguished by its yellowish ascomata that aggregate in clusters on a single stromatic base, covered by a crustose layer, having a papillate, periphysate ostiolar region, and a sporodochial asexual morph forming flame-like conidial masses, not known for other genera in the *Hypocreales* (Rossman et al. 1999, Sung et al. 2007, Lombard et al. 2015). Based on phylogenetic inference of the LSU gene sequences (Fig. 17), *Flammocladiella* is closely related to members of the *Clavicipitiaceae* and *Ophiocordycipitaceae*, but does not share any morphological features with members of those families. Members of the *Clavicipitiaceae* and *Ophiocordycipitaceae* are generally characterised by superficial or totally immersed ascomata producing cylindrical, multiseptate and disarticulating ascospores (Sung et al. 2007). Furthermore, the *Clavicipitiaceae* are generally associated with grasses, whereas the *Ophiocordycipitaceae* are known as pathogens of wood-inhabiting insect hosts (Sung et

al. 2007), ecologies not shared by *Flammocladiella*. Therefore, a discrete family, the *Flammocladiellaceae*, is introduced to accommodate the monotypic genus *Flammocladiella*.

Authors: L. Lombard, P.W. Crous & R. K. Schumacher

***Mycotribulus indonesiae*** Crous & M.J. Wingf., **sp. nov.** – Fig. 18  
Mycobank MB809685

Description. – Associated with leaf litter of *Eucalyptus* spp. – Conidiomata pycnidoid, separate, subepidermal, exuding a pale yellow conidial cirrus; subglobose, to 350 µm wide, and 400 µm high, unilocular, often irregularly lobed, opening by irregular rupture of apical wall, 20–30 µm thick, of brown *textura angularis*, becoming hyaline towards centrum. – Paraphyses hyaline, smooth, branched or not, septate, 30–100 × 2–3 µm; apex irregularly curved to lobed. – Conidiophores 0–2-septate, unbranched or branched below, 10–25



**Fig. 18.** *Mycotribulus indonesiae* (CBS 133172). **A.** Conidiomata on OA. **B.** Conidiophores. **C.** Conidia. Scale bars: A = 350 µm, all others = 10 µm.

× 3–4 µm, hyaline, smooth, subcylindrical. – Conidiogenous cells subcylindrical, terminal and lateral, hyaline, smooth, 5–15 × 1.5–2.5 µm. – Conidia naviculate to fusiform, tapering to acutely rounded apex, and truncate base, aseptate, smooth, guttulate, (13)15–16(18) × (2.5)3 µm, bearing a single tubular, filiform, flexuous apical appendage, 10–12 µm long; basal appendages (2–3) lateral, slightly above (1–3 µm) truncate base, unbranched, divergent, straight to flexuous, 9–12 µm long.

**E t y m o l o g y.** – Name reflects the country from which it was collected, Indonesia.

**C u l t u r e c h a r a c t e r i s t i c s.** – Colonies spreading, erumpent, with sparse to moderate dirty white aerial mycelium and smooth, even margins. On OA surface and reverse salmon. On PDA surface dirty white, similar in reverse. On MEA surface and reverse sienna; fertile on SNA.

**M a t e r i a l e x a m i n e d.** – INDONESIA, from leaves of *Eucalyptus pellita* × *E. brassiana* (*Myrtaceae*), M.J. Wingfield (holotype CBS H-21925, culture ex-type CBS 133172 = CPC 20836).

**N o t e s.** – The genus *Mycotribulus* (Fig. 1; *Physalacriaceae*, *Agaricales*) is monotypic (Crous et al. 2014 a). Isolates of *M. mirabilis* have in the past been isolated from substrates such as *Eucalyptus*, *Apodytes abbottii*, *Mangifera indica* and *Syzygium cordatum* (Crous 1993, Marinowitz et al. 2010). The isolate studied here was originally identified as *M. mirabilis*, which has conidia that are (9)13–15(18) × (2.5)3(3.5) µm in size. *Mycotribulus indonesiae* is phylogenetically distinct (92% identical on ITS, 813/880 characters), and also has longer conidia (Crous et al. 2014 a).

**A u t h o r s:** P. W. Crous & M. J. Wingfield

***Myrmecridium spartii*** Crous & R.K. Schumach., **sp. nov.** – Fig. 19  
MycoBank MB812532

**D e s c r i p t i o n.** – On SNA mycelium consisting of hyaline, thin-walled, smooth, 2–3 µm diam.

hyphae. – Conidiophores erect, unbranched, straight, medium brown, thick-walled, 40–160 × 4–8 µm, 4–12-septate; with characteristic nodal swellings along length of conidiophore. – Conidiogenous cells integrated, terminal and intercalary, cylindrical, 10–30 µm long, medium brown, fertile region forming a rachis with pimple-like denticles arranged in whorls along the conidiogenous axis, less than 0.5–3 µm long, and 0.5–1 µm wide, unpigmented, slightly thickened scars. – Conidia solitary, aseptate, pale brown, thin-walled, finely verruculose, on SNA some conidia have a wing-like gelatinous sheath up to 0.5 µm thick, ellipsoidal to obovoid or fusiform, (6.5)8–9(10) × 3(4) µm; tapering from obtuse apex to subtruncate base; hilum unthickened, 0.5 µm thick.

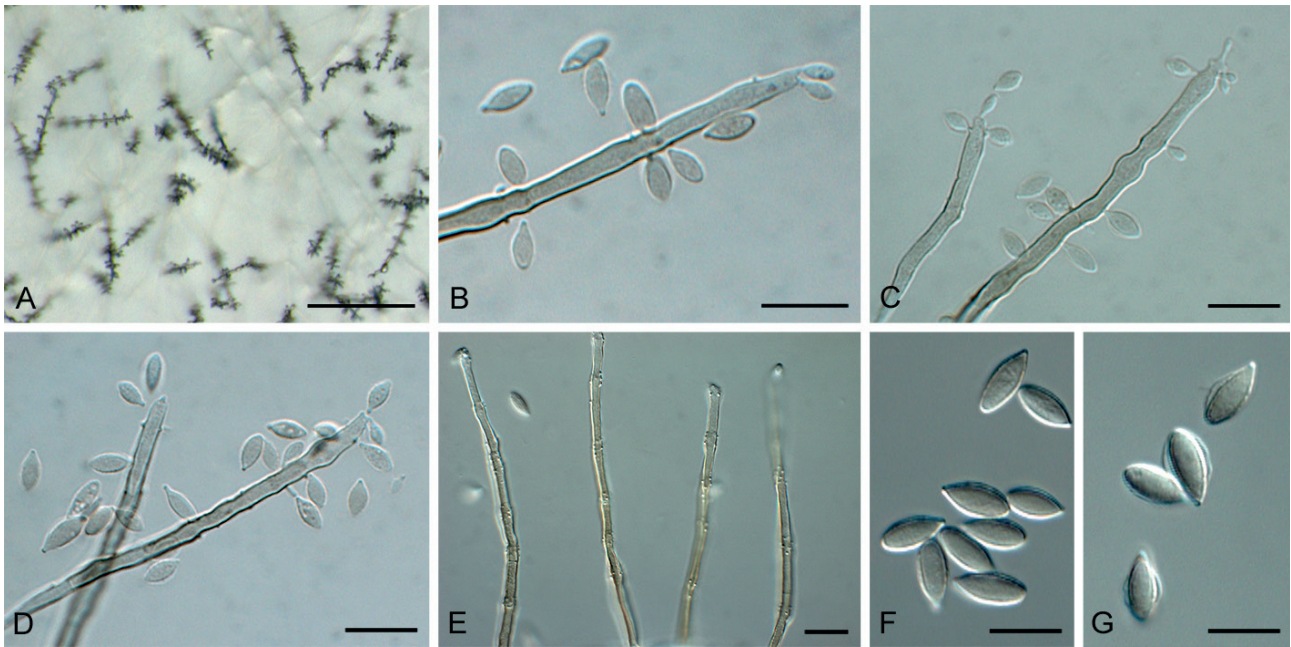
**E t y m o l o g y.** – Name reflects the host genus *Spartium*, from which this fungus was collected.

**C u l t u r e c h a r a c t e r i s t i c s.** – Colonies spreading, with smooth, even margin and sparse aerial mycelium, reaching 50 mm diam. after 1 month at 25 °C. On PDA surface salmon, reverse buff; on MEA surface hazel, reverse isabelline; on OA surface isabelline.

**M a t e r i a l e x a m i n e d.** – SPAIN, Jaén, Los Villares, 3°48'14.02"O, 37°39'31.29"N, alt. 970 m a.s.l., on stem of *Spartium junceum* (*Fabaceae*), 24 June 2014, S. Tello (holotype CBS H-22258, culture ex-type CPC 24953 = CBS 140006).

**N o t e s.** – The genus *Myrmecridium* (Fig. 1; *Myrmecridiaceae*, *Myrmecridiales*, Crous et al. 2015) was erected by Arzanlou et al. (2007) for a group of hyphomycetes with hyaline mycelium and pale to unpigmented, pimple-like denticles, and presently contains six species (Crous et al. 2011 b, 2012 a, 2015). Phylogenetically *M. spartii* (conidia aseptate, 6.5–10 × 3–4 µm) is closely related (99% identical on ITS, 533/540 characters) to *M. banksiae* (conidia aseptate, 9–14 × 2.5–3.5 µm), which is easily distinguishable morphologically based on its larger conidia.

**A u t h o r s:** P. W. Crous & R. K. Schumacher



**Fig. 19.** *Myrmecridium spartii* (CBS 140006). **A.** Conidiophores on SNA. **B–E.** Conidiophores with conidiogenous loci. **F, G.** Conidia (note mucoid sheath). Scale bars: A = 150  $\mu\text{m}$ , all others = 10  $\mu\text{m}$ .

***Neodevriesia poagens*** Crous, **sp. nov.** – Fig. 20  
Mycobank MB812533

**Description.** – Ascomata pseudothecial, separate in clusters on dead culms, black, erumpent to superficial, globose, 60–100  $\mu\text{m}$  diam., apical ostiole 10–15  $\mu\text{m}$  diam.; wall consisting of 2–3 layers of medium brown *textura angularis*. – Asci aparaphysate, fasciculate, bitunicate, subsessile, obovoid to broadly ellipsoidal, straight to slightly curved, 8-spored, 30–40  $\times$  9–11  $\mu\text{m}$ . – Ascospores tri- to multiseriate, overlapping, hyaline, with two prominent guttules per cell, thin-walled, straight to slightly curved, fusoidal-ellipsoidal with obtuse ends, widest in middle of apical cell, medianly 1-septate, not constricted at septum, tapering towards both ends, but more prominently towards lower end, becoming brown and verruculose while still in asci, (12)13–14(16)  $\times$  3(3.5)  $\mu\text{m}$ . Germinating from both ends, at times with lateral branches becoming constricted at septum, up to 6  $\mu\text{m}$  diam., brown and verruculose.

**Etymology.** – Name reflects the host genus *Poa*, from which this fungus was collected.

**Culture characteristics.** – Colonies spreading, erumpent, with sparse aerial mycelium and smooth, lobed margins, reaching 7 mm diam.

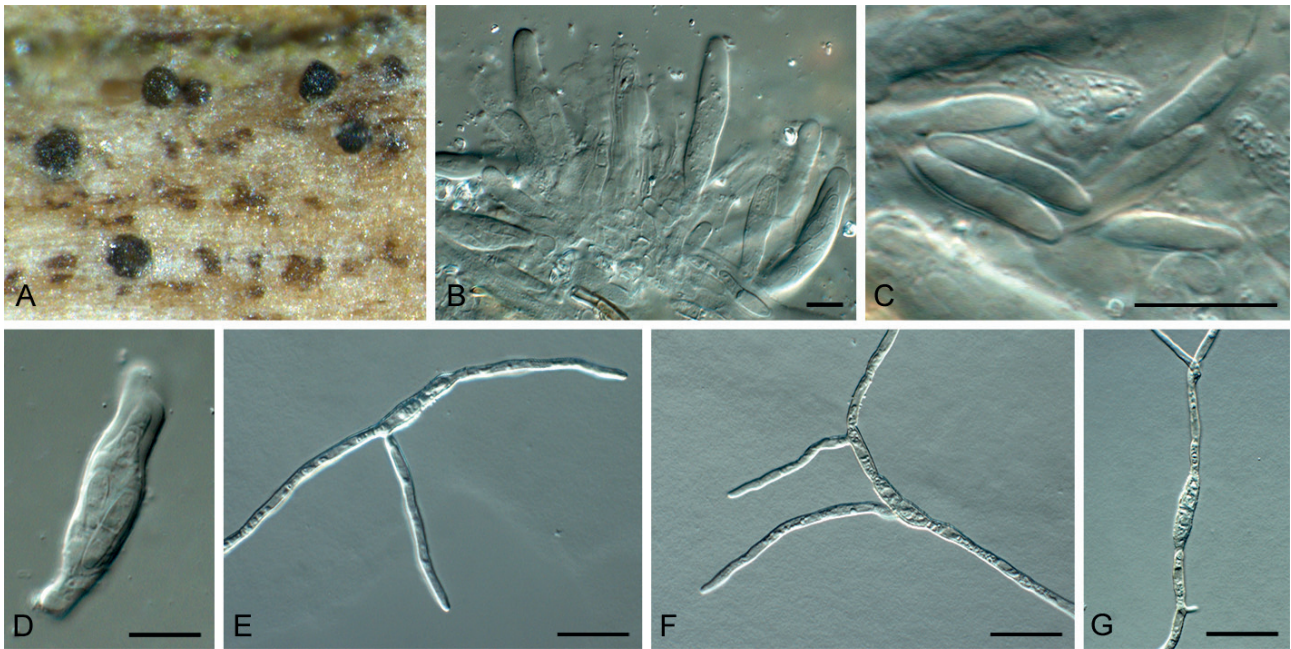
after 1 month at 25  $^{\circ}\text{C}$ . On PDA, OA and MEA surface olivaceous grey, reverse iron grey.

**Material examined.** – NETHERLANDS, Nijmegen, on culms of *Poa* sp. (*Poaceae*), Oct 2014, leg. W. Quaedvlieg (holotype CBS H-22259, culture ex-type CPC 25086 = CBS 140007).

**Notes.** – Seifert et al. (2004) introduced the genus *Devriesia* for a group of cladosporium-like heat-tolerant hyphomycetes that are soil-inhabiting, with slightly darkened, planate, unthickened conidial scars, forming chlamyospores in culture. Quaedvlieg et al. (2014) introduced the new family *Neodevriesiaceae* (*Capnodiales*, *Dothideomycetes*) with a single genus, *Neodevriesia*, which in contrast to *Devriesia*, includes species that are not heat-tolerant and do not form chlamyospores. Several taxa in the *Neodevriesiaceae* were left untreated, because the generic boundary of *Neodevriesia* was unclear. To retain these species in *Devriesia*, however, is also not appropriate and we have thus expanded the limits of *Neodevriesia* to include all devriesia-like taxa in the *Neodevriesiaceae* (Fig. 1).

***Neodevriesia agapanthi*** (Crous) Crous, **comb. nov.**  
Mycobank MB812534

**Basionym.** – *Devriesia agapanthi* Crous, *Periconia* 28: 181. 2012.



**Fig. 20.** *Neodevriesia poagens* (CBS 140007). **A.** Ascomata on host tissue. **B, D.** Asci. **C.** Ascospores. **E–G.** Germinating ascospores. Scale bars = 10  $\mu$ m.

***Neodevriesia bulbilosa*** (Egidi & Zucconi) Crous, **comb. nov.**

Mycobank MB812552

Basionym. – *Devriesia bulbilosa* Egidi & Zucconi, *Fungal Diversity* **65**: 148. 2014.

***Neodevriesia capensis*** (Crous) Crous, **comb. nov.**

Mycobank MB812535

Basionym. – *Teratosphaeria capensis* Crous, *Persoonia* **27**: 38. 2011.

***Neodevriesia imbrexigena*** (Crous & M.J. Wingf.) Crous, **comb. nov.**

Mycobank MB812536

Basionym. – *Devriesia imbrexigena* A.J.L. Phillips & M.L. Coutinho, *Persoonia* **29**: 195. 2012.

***Neodevriesia knoxdaviesii*** (Crous) Crous, **comb. nov.**

Mycobank MB812537

Basionym. – *Teratosphaeria knoxdaviesii* Crous, ‘as *knoxdaviesii*’, *Persoonia* **20**: 75. 2008.

***Neodevriesia lagerstroemiae*** (Crous & M.J. Wingf.) Crous, **comb. nov.**

Mycobank MB812538

Basionym. – *Devriesia lagerstroemiae* Crous & M.J. Wingf., *Stud. Mycol.* **64**: 38. 2009.

***Neodevriesia modesta*** (Isola & Zucconi) Crous, **comb. nov.**

Mycobank MB812539

Basionym. – *Devriesia modesta* Isola & Zucconi, *Fungal Diversity* **65**: 148. 2014.

***Neodevriesia queenslandica*** (Crous, R.G. Shivas & McTaggart) Crous, **comb. nov.**

Mycobank MB812540

Basionym. – *Devriesia queenslandica* Crous, R.G. Shivas & McTaggart, *Persoonia* **26**: 141. 2011.

***Neodevriesia shakazului*** (Crous) Crous, **comb. nov.**

Mycobank MB812541

Basionym. – *Devriesia shakazului* Crous, *Persoonia* **29**: 171. 2012.

***Neodevriesia simplex*** (Selbmann & Zucconi) Crous, **comb. nov.**

Mycobank MB812542

Basionym. – *Devriesia simplex* Selbmann & Zucconi, *Fungal Diversity* **65**: 148. 2014.

***Neodevriesia stirlingiae*** (Crous) Crous, **comb. nov.**  
MycoBank MB812543

Basionym. – *Devriesia stirlingiae* Crous, *Per-soonia* 29: 175. 2012.

***Neodevriesia strelitziae*** (Arzanlou & Crous) Crous, **comb. nov.**  
MycoBank MB812544

Basionym. – *Devriesia strelitziae* Arzanlou & Crous, *Fungal Planet* No. 22. 2008.

Author: P.W. Crous

***Paracamarosporium fagi*** Crous & R.K. Schumach., **sp. nov.** – Fig. 21  
MycoBank MB812545

Description. – Conidiomata solitary, immersed to erumpent, globose, up to 200 µm diam. with central ostiole; wall of 2–3 layers of brown *textura angularis*. – Conidiophores reduced to conidiogenous cells or with a supporting cell (note septation in Fig. 21D and E), lining the inner cavity. – Conidiogenous cells hyaline, smooth, ampulliform, 5–10 × 4–5 µm; apex with prominent periclinal thickening, or with percurrent proliferation. – Paraphyses intermingled among conidiogenous cells, subcylindrical, hyaline, septate, up to 30 µ long, 3–5 µm diam. – Conidia solitary, subcylindrical with obtuse ends, initially hyaline,

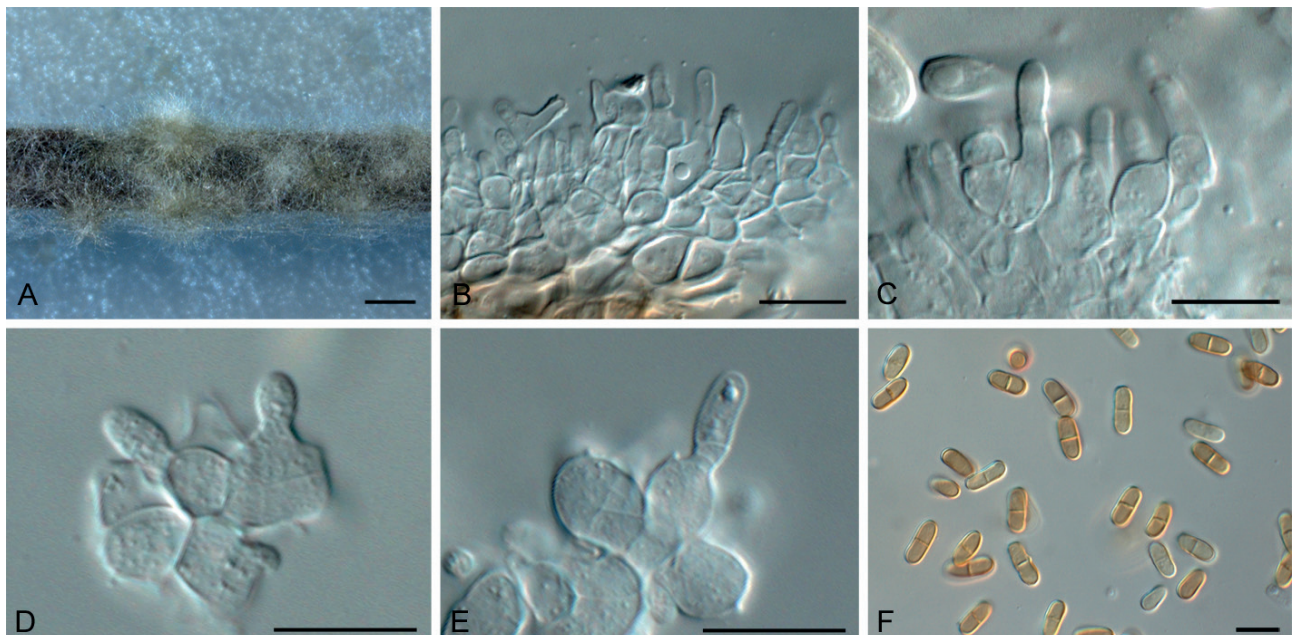
smooth, aseptate, becoming brown, medianly 1-septate and surface becoming warty with age, (6)8–9(10) × (3.5)4–5 µm.

Etymology. – Name reflects the host genus *Fagus*, from which this species was isolated.

Culture characteristics. – Colonies spreading, erumpent, with sparse to moderate aerial mycelium and smooth, even margins, reaching 60 mm diam. after 1 month at 25 °C. On MEA surface vinaceous buff, reverse rust to umber; on PDA surface ochreous, reverse umber; on OA surface cinnamon.

Material examined. – GERMANY, on twig of *Fagus sylvatica* (Fagaceae), 10 May 2014, leg. R. K. Schumacher (holotype CBS H-22260, culture ex-type CPC 24890 = CBS 140008), CPC 24892.

Notes. – The genus *Paraconiothyrium* was established by Verkley et al. (2004) for some species with coniothyrium-like asexual morphs (conidia 0–1-septate) having both phialidic (periclinal thickening) and percurrent (annellidic) conidiogenesis in the *Montagnulaceae*. Verkley et al. (2014) chose to retain a paraphyletic concept for the genus, because the alternative would have required the introduction of numerous novel genera. It would also have rendered the morphological system currently used to identify these taxa unworkable. Wijayawardene et al. (2014) introduced two novel genera in this complex, namely *Paraconiothyrium* and *Pseudocamarosporium*, although the phylogenetic clades provided poor support,



**Fig. 21.** *Paracamarosporium fagi* (CBS 140008). **A.** Conidiomata on SNA. **B–E.** Conidiogenous cells. **F.** Conidia. Scale bars: A = 200 µm, all others = 10 µm.

and no attention was given to the other taxa in the *Paraconiothyrium* complex.

*Paracamarosporium fagi* (*Didymosphaeriaceae*, *Pleosporales*, *Dothideomycetes*) clusters in a clade containing species allocated to *Paracamarosporium*, and hence it is classified in this genus. This is despite the fact that its morphology more closely resembles *Paraconiothyrium* than that ascribed to *Paracamarosporium*. A phylogeny of LSU alone (Fig. 1) lacks the resolution to efficiently distinguish the genera in this complex; combining LSU and ITS alignments (Fig. 22) improves the resolution for generic assignment of species.

Because of the introduction of these two genera several other coniothyrium-like taxa require re-naming as follows:

***Paracamarosporium hawaiiense*** (Crous) Crous, **comb. nov.**

Mycobank MB812427

**Basionym.** – *Microdiplodia hawaiiensis* Crous, *Fungal Planet* No. 7: 1. 2006.

**Synonym.** – *Paraconiothyrium hawaiiense* (Crous) Damm, Crous & Verkley, *Persoonia* 20: 16. 2008.

***Paracamarosporium leucadendri*** (Marinc. et al.) Crous, **comb. nov.**

Mycobank MB812546

**Basionym.** – *Camarosporium leucadendri* Marinc. et al., In: Marincowitz et al., *CBS Biodiversity Series (Utrecht)* 7: 93. 2008.

***Pseudocamarosporium africanum*** (Damm et al.) Crous, **comb. nov.**

Mycobank MB812547

**Basionym.** – *Paraconiothyrium africanum* Damm, Verkley & Crous, *Persoonia* 20: 14. 2008.

***Pseudocamarosporium brabeji*** (Marincowitz, M.J. Wingf. & Crous) Crous, **comb. nov.** Mycobank MB812548

**Basionym.** – *Camarosporium brabeji* Marincowitz, M.J. Wingf. & Crous, In: Marincowitz et al., *CBS Biodiversity Series (Utrecht)* 7: 90. 2008.

***Verrucoconiothyrium*** Crous, **gen. nov.**

Mycobank MB812549

**Description.** – Mycelium immersed, hyphae septate, medium brown, finely verruculose, forming intercalary and terminal chains of globose

chlamydospores. Conidiomata pycnidial, sub-epidermal, globose, separate, brown; wall consisting of 3–4 layers of brown cells of *textura angularis*. Conidiogenous cells discrete, smooth, hyaline to pale olivaceous, doliiform to ampulliform, proliferating percurrently. Conidia medium brown, thick-walled, verruculose, 0–1-septate, ellipsoidal to subcylindrical.

**Type species.** – *Verrucoconiothyrium nitidae*.

**Etymology.** Name reflects the fact that this genus resembles *Coniothyrium*, but that it has verrucose conidia.

***Verrucoconiothyrium nitidae*** (Crous & Denman) Crous, **comb. nov.**

Mycobank MB812550

**Basionym.** – *Coniothyrium nitidae* Crous & Denman, *S. Afr. J. Bot.* 64: 138. 1998.

**Notes.** – *Verrucoconiothyrium nitidae* (*Didymosphaeriaceae*, *Pleosporales*, *Dothideomycetes*) is a foliar pathogen of *Proteaceae* (Swart et al. 1998, Crous et al. 2013 a), which was uncomfortably retained in *Coniothyrium* pending further collections. Given the narrow delimitation of *Coniothyrium*, *Paraconiothyrium* and other camarosporium-like genera (sensu Wijayawardene et al. 2014), a new genus is required to accommodate this pathogen.

**Authors:** P. W. Crous & R. K. Schumacher

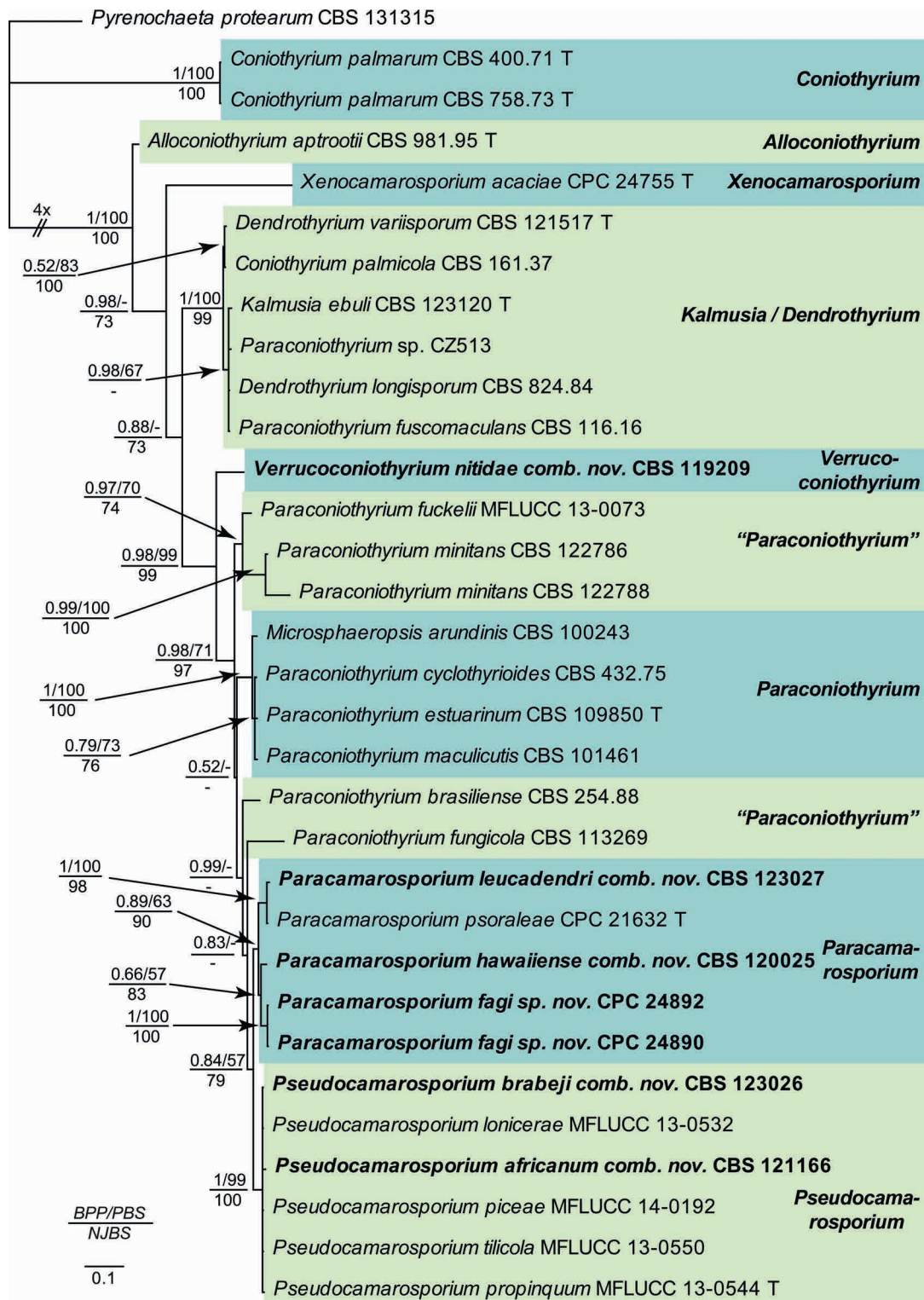
***Phaeoisaria loranthacearum*** Crous & R.K. Schumacher., **sp. nov.** – Fig. 23

Mycobank MB812551

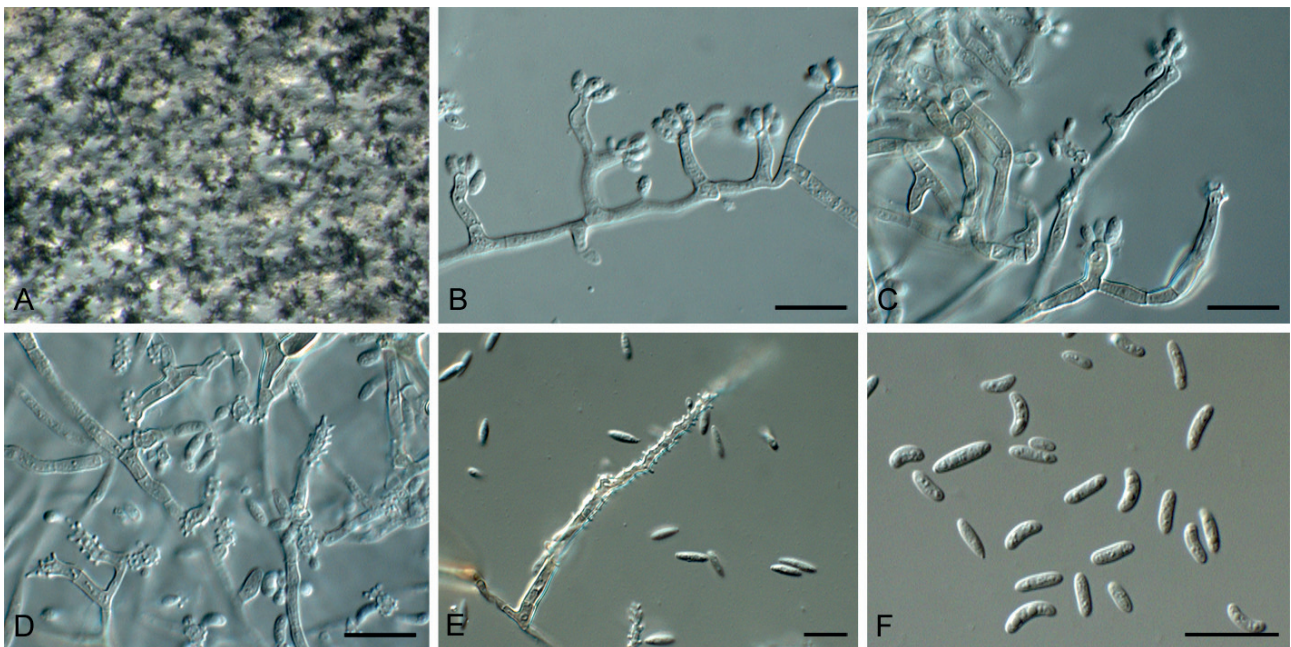
**Description.** – Mycelium consisting of hyaline, smooth, septate, branched, 2–3 µm diam. hyphae. – **Conidiophores** arising from superficial hyphae, erect, solitary, branched at base or not, subcylindrical, straight to geniculate-sinuuous, 1–3-septate, hyaline, becoming medium brown, smooth, 10–30 × 2–3 µm. – **Conidiogenous cells** terminal or intercalary, straight to flexuous, hyaline to pale brown, frequently swollen at the apex, with several aggregated denticles along a long rachis covering length of conidiophore with age, 0.5–1.5 µm long and 0.5 µm diam., 7–16 × 2–3.5 µm. – **Conidia** solitary, hyaline, smooth, fusoidal-ellipsoidal with obtuse ends, straight to falcate, guttulate, (5)7–8(9) × (1.5)2(3) µm.

**Etymology.** – Name reflects the host genus *Loranthus*, from which this fungus was isolated.

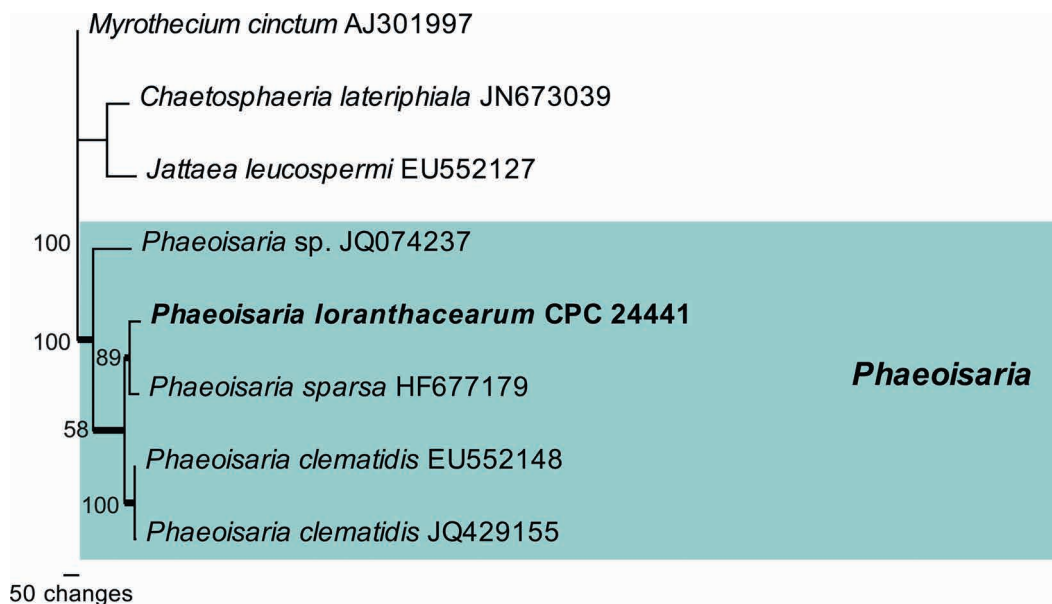
**Culture characteristics.** – Colonies spreading, up to 30 mm diam. after 1 month at 25 °C, with moderate aerial mycelium, and smooth, lobed margin. On MEA surface fawn, reverse brown



**Fig. 22.** Consensus phylogram (50 % majority rule) of 3 152 trees resulting from a Bayesian analysis of the combined LSU and ITS sequence alignment (61 and 232 unique site patterns, respectively) using MrBayes v. 3.2.1 (Ronquist et al. 2012). The scale bar shows the expected changes per site, and Bayesian posterior probability (BPP), parsimony bootstrap support (PBS) and distance bootstrap support (NJBS) values from 1 000 replicates are shown at the nodes. Genera are indicated in coloured blocks and the species treated here are printed in bold face. The tree was rooted to *Pyrenochaeta protearum* (strain CBS 131315).



**Fig. 23.** *Phaeoisaria loranthacearum* (CBS 140009). **A.** Colony on SNA. **B–E.** Conidiophores with denticulate conidiogenous loci. **F.** Conidia. Scale bars = 10 µm.



**Fig. 24.** The first of two equally most parsimonious trees obtained from a heuristic search with 100 random taxon additions of the ITS sequence alignment (Characters: 149 parsimony-informative, 240 constant, and 133 variable and parsimony-uninformative) using PAUP v. 4.0b10 (Swofford 2003). The scale bar shows 50 changes, and bootstrap support values from 1 000 replicates are shown at the nodes. Thickened lines indicate the strict consensus branches and the species treated here is printed in bold face. The genus *Phaeoisaria* is indicated with a coloured block. The tree was rooted to *Myrothecium cinctum* (GenBank accession AJ301997). Tree length = 444; CI = 0.874; RI = 0.755; RC = 0.660.



vinaceous; on OA surface fawn; on PDA surface and reverse isabelline.

**Material examined.** – GERMANY, on twigs of *Loranthus europaeus* (Loranthaceae), growing on twigs of *Quercus* (Fagaceae), 8 Feb. 2014, leg. K.-H. Rehn (Holotype CBS H-22261, culture ex-type CPC 24441 = CBS 140009).

**Notes.** – *Phaeoisaria loranthacearum* (*incertae sedis*, *Sordariomycetes*) is phylogenetically allied to *P. clematidis* (conidia 4–10 × 1.5–2.5 µm; Ellis 1971), a species commonly occurring on many different substrates, and having a global distribution (Ellis 1971), as well as to *Phaeoisaria sparsa* (GenBank HF677179) (Fig. 24). It is distinguishable by not forming synnemata in culture, though its conidial dimensions are rather similar to that of *P. clematidis*, 5–9 × 1.5–3 µm (Ellis 1971), suggesting *P. clematidis* is probably a species complex.

**Authors:** P.W. Crous & R. K. Schumacher

***Phomatospora striatigera*** Scheuer, *Biblioth. Mycol.* **123**: 152. 1988. – Fig. 25

**Description.** – Ascomata brown, subglobose, 160–250 µm diam., ostiolate, scattered, immersed, with a cylindrical black beak, approx. 30–45 µm high, 40–50 µm diam., perforating the epiderm of the host; wall 5–10 µm thick, composed of 3–5 layers of brown cells, 5–10 × 2 µm. – **Paraphyses** hyaline, frequently dissolving at maturity, septate, sometimes strongly constricted at the septa, up to 7.5 µm diam. at the base, sometimes less than 1 µm diam. at the apex, extending above the asci. – **Asci** 8-spored, 70–140 × 6–10 µm, unitunicate, cylindrical, bluntly truncate at the apex, with an apical ring, 1.5 µm high, 2 µm diam., J–, uni- to biserial. – **Ascospores** (18)20–24(27) × 4–5(6) µm, fusiform, two-celled (septum well visible in Melzer) with two large central guttules, one up to 4.8 µm diam., the second slightly smaller, and two secondary little guttules towards apices, longitudinally striate, with bipolar gelatinous caps, 1–2 µm diam. (visible in water and lactic acid).

**Materials examined.** – AUSTRIA, Eisenwurzen, Lunzer See, Magnocaricetum, alt. 610 m, on leaves of *Carex gracilis* (Cyperaceae), 18 June 1981, leg. C. Scheuer (holotype, GZU). – FRANCE, St André d’Embrun, Hautes-Alpes, lac de Siguret, alt. 1060 m, on leaves of *Typha angustifolia* (Typhaceae), 13 Aug. 2012, leg. A. Gardiennet (epitype designated here CBS H-21923, MBT178722, culture ex-epitype = CPC 21263 = CBS 133932); Foncegrive, Côte-d’Or, rive de la Venelle, alt. 310 m, on *Carex acutiformis* (Cyperaceae), 23 Aug. 2012, leg. A. Gardiennet, Herb. AG12092; Boussenois, Côte-d’Or, combe du Jeune Sagne, alt. 380 m, on *Carex acutiformis*, 25 Aug. 2012, leg. A. Gardiennet, Herb. AG12093.

**Notes.** – The epitype specimen of *Phomatospora striatigera* (*incertae sedis*, *Sordariomycetes*)

proposed above closely matches the morphology of the holotype, with ascospores being striate, having mucoid caps, and measuring (22)23–27 × 4–6 µm (Scheuer 1988, Fallah & Shearer 1998). The genus is currently considered *incertae sedis* and is sister to *Myrmecridiales* (Fig. 1).

**Authors:** P.W. Crous & A. Gardiennet

***Pseudodinemaspodium fabiforme*** A. Hashim., G. Sato & Kaz. Tanaka, *Mycologia* **107**: 390. 2015. – Fig. 26

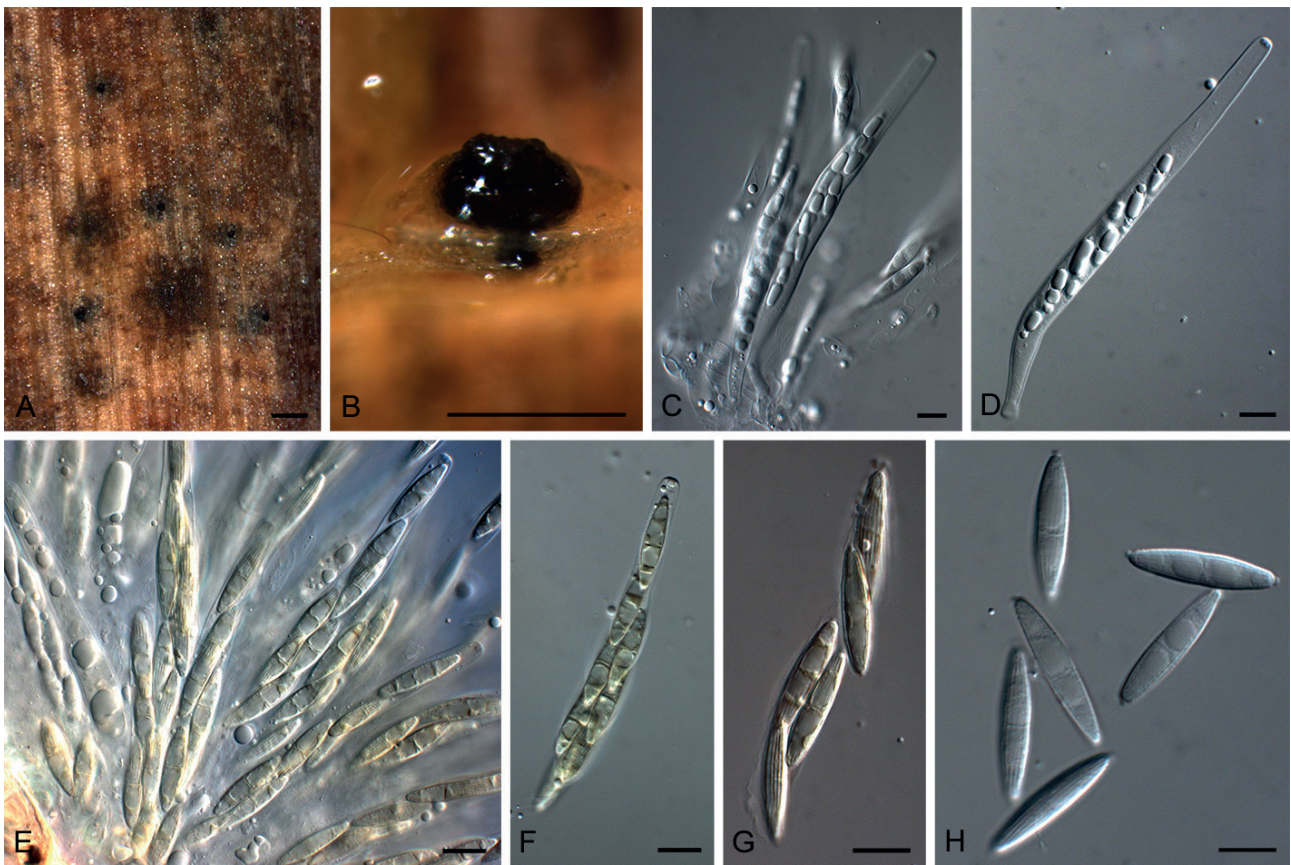
**Description.** – Conidiomata scattered to gregarious, superficial, cupulate (not stipitate), brown, up to 400 µm diam.; basal excipulum of *textura intricata*. Setae arising from outer elements of excipulum, sparse, subulate to subcylindrical, apex blunt to subobtusely rounded, straight, 4–6-septate, dark brown, thick-walled, smooth, up to 200 µm long, apex 4–6 µm diam. Conidiophores arising from conidiomatal cavity, septate, branched, hyaline, up to 40 µm long. Conidiogenous cells integrated, terminal and intercalary, lageniform to subcylindrical, frequently in whorls, hyaline, thin-walled, smooth, 15–20 × 1.5–2 µm. Conidia naviculate to botuliform, aseptate, thin-walled, smooth, 3–4 × 1.5–2 µm, with an unbranched appendage at each end, 0.5–1 µm long.

**Culture characteristics.** – Colonies spreading, erumpent, up to 30 mm diam. after 1 month at 25 °C, surface folded, with sparse aerial mycelium and smooth, lobed margins. On PDA surface and reverse buff; on MEA surface and reverse dirty white with patches of vinaceous; on OA surface buff, with patches of vinaceous.

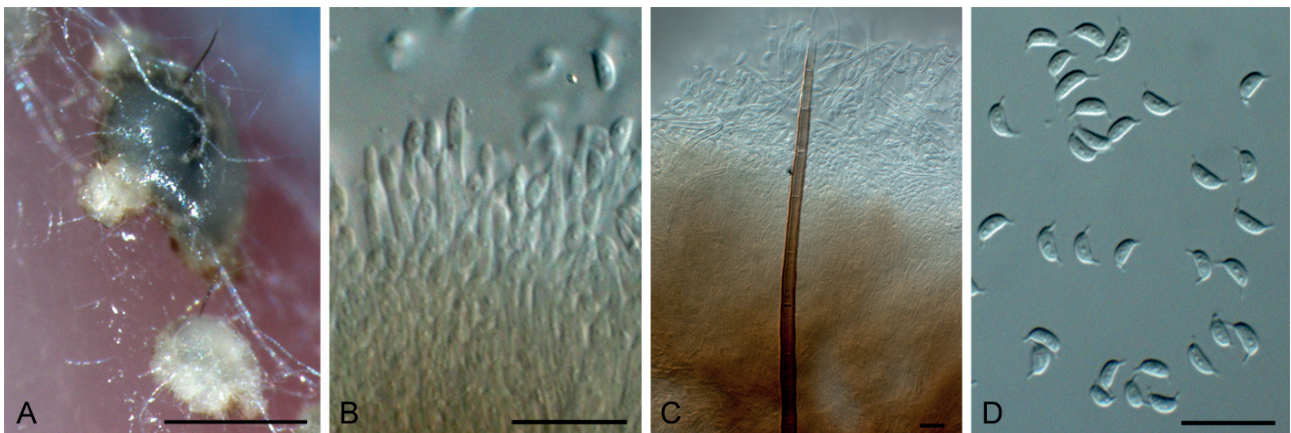
**Material examined.** – MALAYSIA, Sarawak, on leaf spots of *Acacia mangium* (Leguminosae), May 2014, leg. M. J. Wingfield (CBS H-22262, culture CPC 24781 = CBS 140010); CPC 24782.

**Notes.** – The genus *Pseudodinemaspodium* (*Chaetosphaeriaceae*, *Chaetosphaeriales*, *Sordariomycetes*; Fig. 1) is morphologically similar to *Dendrophoma* (Crous et al. 2012 b), having cupulate conidiomata, and naviculate to botuliform conidia with unbranched appendages at each end. The obvious morphological difference lies in their conidiomata, with those of *Dendrophoma* being stipitate, at first globose and closed, then opening to become cupulate (see Crous et al. 2012 b, fig. 4). *Pseudodinemaspodium* was recently described from dead twigs of *Betula platyphylla* collected in Japan (Hashimoto et al. 2015), and this is a second record of this fungus from Asia, but occurring on leaves of *Acacia mangium* in Malaysia.

**Authors:** P.W. Crous & M. J. Wingfield



**Fig. 25.** *Phomatospora striatigera* (CBS 133932). **A, B.** Ascomata on host tissue. **C–F.** Asci. **G, H.** Ascospores (note striations and mucoid caps). Scale bars: A, B = 250  $\mu\text{m}$ , all others = 10  $\mu\text{m}$ .



**Fig. 26.** *Pseudodinemasporium fabiforme* (CBS 140010). **A.** Conidioma on OA. **B.** Conidiogenous cells. **C.** Seta. **D.** Conidia. Scale bars: A = 400  $\mu\text{m}$ , all others = 10  $\mu\text{m}$ .

*Sclerostagonospora cycadis* Crous & G. Okada, *Periconia* 26: 137. 2011. – Fig. 27

**Description.** – Conidiomata up to 200 µm diam., erumpent, separate, pycnidial, globose, dark brown to black, with central ostiole; wall of 2–3 layers of brown *textura angularis*. – Conidiophores reduced to a single supporting cell, subcylindrical to doliiform, hyaline to pale brown, smooth, 4–6 × 3–5 µm, giving rise to 1(2) conidiogenous cells. – Conidiogenous cells ampulliform, hyaline to pale olivaceous, smooth, with several inconspicuous percurrent proliferations at apex, 7–12 × 3–5 µm. – Conidia solitary, ellipsoidal, medium brown, finely verruculose, transversely 3-septate, not constricted at septa, first forming medium septum, then apical and basal seta; apex bluntly rounded, tapering from middle to flattened base, 1.5–2 µm diam.; hilum at times with minute marginal frill, (9)10–11(12) × (3)4(4.5) µm, rarely with oblique septa.

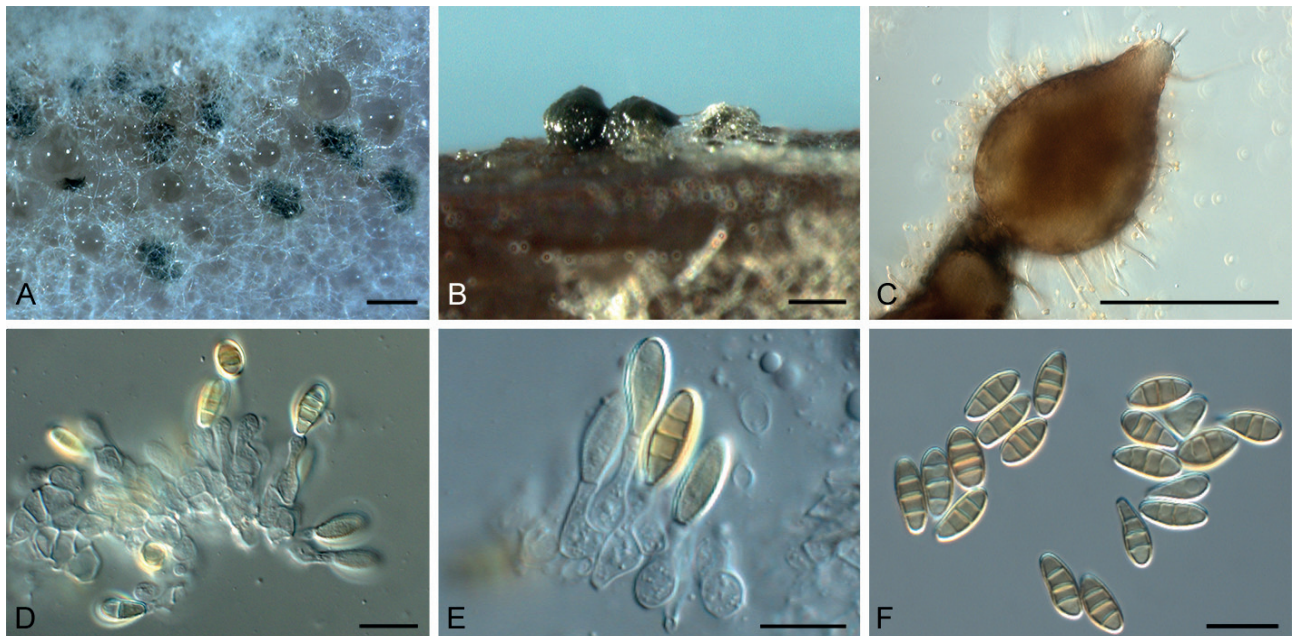
**Culture characteristics.** – Colonies spreading, erumpent, surface folded, with moderate aerial mycelium; margins lobed, reaching 20 mm diam. after 2 weeks. On MEA surface smoke grey, reverse olivaceous grey; on PDA surface pale oli-

vaceous grey, reverse olivaceous grey to pale olivaceous grey. On OA surface smoke grey in centre, greyish sepia at outer margin.

**Material examined.** – JAPAN, Chiba, Umihotaru Parking Area, Tokyo Bay Aqualine highway, on living leaves of *Cycas revoluta* (Cycadaceae), 22 Oct. 2005, leg. P. W. Crous & G. Okada, holotype CBS H-20161, culture ex-type CPC 12388 = CBS 123538. – MEXICO, on leaves of *Dioscorea composita* (Dioscoreaceae), May 1976, leg. G. F. Bonavia (CBS H-22264, culture CBS 291.76).

**Notes.** – The type species of the genus *Sclerostagonospora*, *S. heraclei*, is not known from culture, and hence its correct phylogenetic relationship remains uncertain pending fresh collections and DNA data. *Sclerostagonospora cycadis* (which is camarosporium-like in morphology) was originally described from leaves of *Cycas revoluta* growing along the Tokyo Bay Aqualine highway (Crous et al. 2011a). It was thus surprising to discover that the same fungus occurs in leaves of *Dioscorea composita* in Mexico. Presently nothing is known about the role of *Sclerostagonospora* spp. as pathogens or endophytes, but it is assumed that its global movement could be attributed to an endophytic nutritional habit. The current species is associated with *Phaeosphaeriaceae* (Pleosporales; Fig. 1).

Author: P. W. Crous



**Fig. 27.** *Sclerostagonospora cycadis* (CBS 291.76). **A.** Conidiomata on OA. **B.** Conidiomata on PNA. **C.** Conidioma with papillate ostiole. **D, E.** Conidiogenous cells. **F.** Conidia. Scale bars: A–C = 200 µm, all others = 10 µm.

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